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ABSTRACT

This teacher's edition of a tenth grade general mathematics workbook attempts to show how certain mathematical skills are needed by the consumer. Each of the ten instructional units contains review exercises, practical applications, and practice problems for three levels of ability. Included are units on: (1) business forms, (2) algebra, (3) banking, (4) geometry, (5) taxes, (6) graphing, (7) data processing, (8) probability, (9) insurance, and (10) hospital work. [Not available in hardcopy due to marginal legibility of original document.] (RS)

WILMINGTON OPERATIONAL MATHEMATICS

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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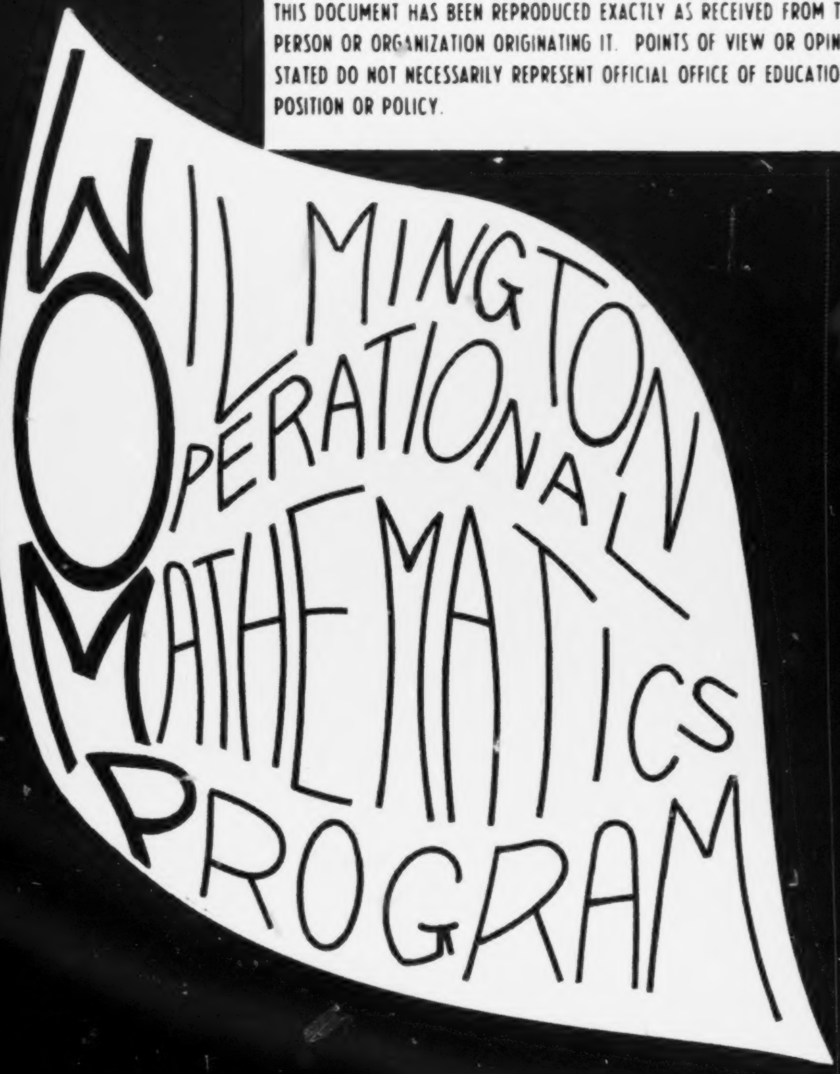
WILMINGTON
OPERATIONAL
MATHEMATICS
PROGRAM

BOOK 2
TEACHER'S EDITION

WILMINGTON PUBLIC SCHOOLS
Wilmington, Delaware

SE 009 589

WILMINGTON

OPERATIONAL

MATHEMATICS

PROGRAM

by

Paul V. Rogler, Director
Arthur Gibson
Leon Davis
Raymond Wilson

This program is the result of work under a grant from the U. S. Office of Education; Department of Health, Education, and Welfare by authority of the Cooperative Research Act.

Wilmington Public Schools
Wilmington, Delaware

ED0 44284

APPENDIX A

Teachers Edition of Wilmington Operational
Mathematics Program, Book II
(only five copies available)

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PREFACE

The Wilmington Operational Mathematics Program is one of the important new efforts of the Mathematics Department of the Wilmington Public Schools, under the leadership of Dr. Paul Rogler, to meet demands for quality in mathematics teaching and learning. It is an attempt to break away from the general mathematics instruction traditionally provided for many tenth grade youngsters.

Providing mathematics closely related to the realities of the "World of Work," "Business Experience," and other units of high interest level associated with early adolescence should spark the motivation and hence the achievement of the youngsters.

For teachers, having readily available well-prepared work sheets, transparencies, and other instructional aids, this volume should prove to be an excellent resource.

Gene A. Geisert
Superintendent of Schools

To the teacher:

We have tried to provide you with ten workable, relevant units that will lead students, sometimes through life situations that hopefully will interest them, and sometimes through mathematics topics that have basic appeal to them, into learning the mathematics needed to be productive citizens.

This teacher's edition contains all the pages that are in the student text. Where answers are needed, they are provided. Where suggestions might help, they, too, are provided. Some pages are worded "ditto provided." For these pages you will be given ditto masters so that you may run off as many as you wish. Please try to keep the dittos in an organized way so they can be used again another year.

We hope that the binding of student texts will be strong enough that they can be distributed to students and will last for at least two years. You may want to keep the texts in the classroom and just distribute them as needed. Either plan is acceptable. The program is experimental. We will see which plan works best. It is not planned to have students write in their texts. Test problems can be copied onto work paper and then done at home.

We have placed, at the left of exercises, the letters A, B, or C according to the level of difficulty of the problems. A problems would be workable for all, even the poorest students. B problems are average difficulty problems. C problems are for those top students who can do some extra challenging work. Feel free to use this information as you wish. If the gradations do not fit your class, don't use them.

We also think that you may wish to change the order of the units. Feel free to do so. We have planned beginning units as interest-getters and foundation-layers, but later units can fit your judgment as to which ones will appeal most to your students.

Paul V. Rogler
Leon Davis
Arthur Gibson
Raymond Wilson

INTRODUCTION

In 1967, with a federal grant, the Wilmington Operational Mathematics Program ame into being. Its objectives were:

--To write units of work that incorporate practical applications from the events and affairs of urban life into a general mathematics outline that is modern in its scope

--To seek out problems from local industry that relate to situations that general students will occupy within a few years after their ninth grade study

--To write units at a reading level compatible to that of slow learning ninth grade students

--To incorporate in the units provision for differentiated instruction that helps the teacher challenge each level of student at his own level

--To keep a developmental treatment of concepts as the heart of the program with many practical problems used as illustrations

--To plan the instruction taking into consideration ways in which these students learn; the use of role playing, games, puzzle-problems, and taped materials for makeup as well as enrichment; real problems that involve student-activity as well as laboratory work should be included.

To accomplish these objectives the director and three teachers, Arthur Gibson, Muriel Rains and Raymond Wilson, all of whom had extensive experience in teaching ninth grade general mathematics, met for six weeks. They reviewed the recommendations of previous general mathematics curriculum committees in Wilmington; they reviewed many collected references on the subject; they met with a consultant from the college level; they visited local industrial plants and consulted with representatives from these plants; they polled student interests; and they then wrote the units as planned. The result was a set of ten units that can provide a year's work in ninth grade general mathematics. The written work has appeal for them. The situation leads to a need for some mathematics. As the need for mathematics is seen, instructional activities and practice are provided. The units are organized so that they lead into successively more difficult concepts as the work progresses. Units have been chosen to spark the motivation of the students, either by reference to natural interests of students, to fields that have vocational connections for them, to business and industrial complexes in our city, or teacher aids, each unit is supplemented by a set of ditto masters of differentiated work sheets geared to the unit and a set of transparencies that aid in the teaching of the unit.

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The ninth grade materials, were written in 1967. They were tried by the project teachers in 1967-68 and rewritten in the summer of 1968.

During the 1968-69 school year, evaluative bi-monthly meetings helped coordinate the work and incorporate new ideas developed by individual teachers.

The tenth grade materials, Book II, were written, again with a federal grant, by Leon Davis, Arthur Gibson, and Raymond Wilson, during the summer of 1969.

Much credit needs to be given to each of the writers, and to the other teachers who have used the program and given their suggestions for improvement. Hopefully, we have here what we first started to visualize when a general Mathematics Planning Committee was first formed in 1964--an organized program for general students that will give them an understanding of mathematics principles while providing down-to-earth examples that relate the use of mathematics to their life experiences.

Paul V. Rogler, Director
Wilmington Operational Mathematics
Program

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Wilmington Public Schools
Wilmington, Delaware

WILMINGTON OPERATIONAL MATHEMATICS PROGRAM

Book II

Part I

UNIT		PAGE
Unit I:	DO Math	1 - 47
Unit II:	Algebra	48 - 120
Unit III:	Banking	121 - 181
Unit IV:	Geometry	182 - 214

Division of Educational Programs in Cooperation
with the
Office of Education,
Bureau of Research

Dr. Gene A. Geisert
Superintendent of Schools

Dr. Paul V. Rogler
Supervisor
Secondary Mathematics Department

1969

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Wilmington Public Schools
Wilmington, Delaware

WILMINGTON OPERATIONAL MATHEMATICS PROGRAM

Book II

Part II

UNIT		PAGES
Unit V:	Taxes	215 - 262
Unit VI:	Graphing	263 - 293
Unit VII:	Data Processing	294 - 319
Unit VIII:	Probability	320 - 348
Unit IX:	Insurance	349 - 373
Unit X:	Hospital Work	374 - 400

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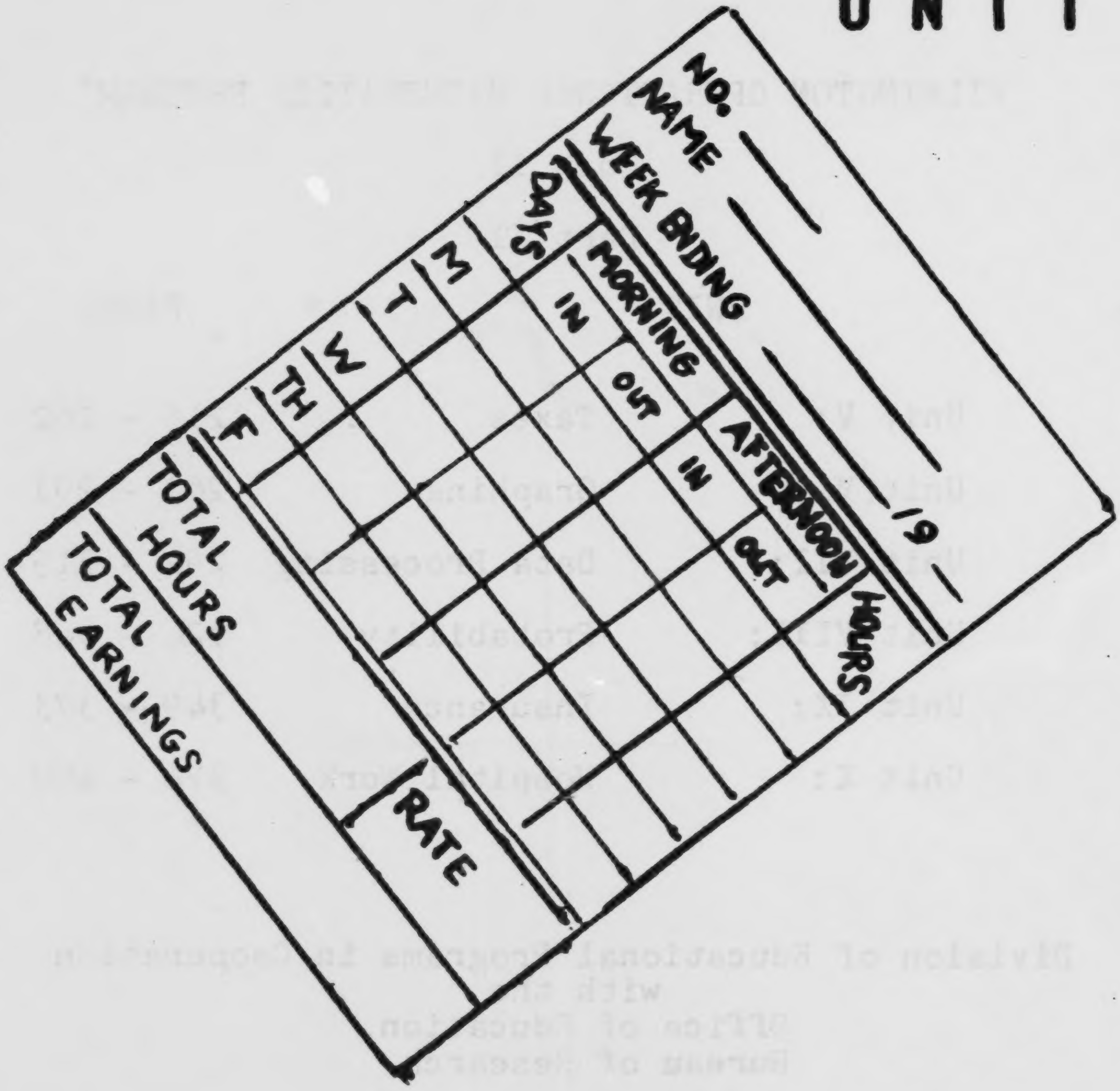
1969

D. O. MATH

UNIT I


NO.
NAME
WEEK ENDING
19
DAYS
MORNING
IN
OUT
AFTERNOON
IN
OUT
HOURS
M
T
W
TH
F
TOTAL HOURS
TOTAL EARNINGS
RATE

In many high schools there is a special program for students who want to work while going to school. Let's call it Diversified Occupations (D.O.) This course of study is open to any student who intends to enter full-time employment after graduation, (general students, business students and college prep students.)

Students enrolled in this program receive valuable working experience and financial aid. Some students attend school half a day and work half a day and some work on a two-week on and off basis.

To the Teacher:

This unit is centered around the "Work Study Program" that has been instituted in many high schools. It is not designed to prepare a student for a particular job, but rather, to give him some practice in filling out forms, applications and a general knowledge of a paycheck. Also, to point out the fact that any employee has responsibilities to himself as well as his employer.

Hopefully, this unit will provide you with some diagnostic testing to help you determine the level of your class in regard to its mathematical ability.

The approach is unique in that we make use of "Role Playing". That is, the students, play the roles of interviewers and interviewees while simulating an actual job interview. They are required to evaluate each other on a rating sheet (primarily mathematics and a few character traits). Finally each student is hired as a sales clerk.

At the end of this unit (teacher's edition only) you will find a number of practice problems dealing with the four fundamental operations on the set of rational numbers to be used either before or after the "Math Skill Test".

actually there are 29 pages of student text — remaining pages will be provided only as dittos

Application for Admission into Diversified Occupations Course

ditto available

Name ______________________ Grade _____

Address ____________________ Course _____

Telephone _________________ Home Room _____ PICTURE

Date of Application ____________________

Age ____ Date of Birth ____________________

Height _______________ Weight _______________

Mother's Name ____________________ Occupation ____________

Father's Name ____________________ Occupation ____________

Occupation Desired - 1st ______________________________

Reason ____

Occupation Desired - 2nd ______________________________

Reason ____

High School Credits ______________________________

Do you intend to go to college? ____ Reason ______________

Do you agree to a two-year training period if a junior or a one-year period if a senior? ______ Times absent last year ____________

Do you have a driver's license? _____ Would you have the use of a car for transportation to and from a job? ______

Have you ever worked? ______ Where? ____________________

____

Type of work? ______________ Employer? ______________

____

____

What are your hobbies, outside interests? ______________

____

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dulle
available

References (Four H.S. teachers) _____________________________________

____

____

Opportunities are available to young people in the industrial and business places in our city, but only to those who are earnest in their efforts to receive training. If you are accepted in the Diversified Occupations Course, do you agree to put forth your best efforts in completing your training? ________________________

Sign ___________________________________

Student's Name

I consent to ____________________________ **entering the Diversified Occupations Course and agree to cooperate with the school and training agency.**

Sign ___________________________________

Parent or Guardian

Note: The Diversified Occupations Course is designed to train students for specific employment. If you plan to go to college, make sure that you select proper college preparatory subjects for college entrance.

Each of you will become a part of America's working force. Any job that you get will require you to know some basic mathematics. Many jobs require you to take a written test before you are hired. Most of these tests have a great deal of mathematics in them.

Name at least two kinds of jobs for each place of employment listed below.

Example:

Department Store

a) Salesman

b) Buyer

1) Hospital

2) Bank

3) Body and Fender Shop

4) Super Market

5) Restaurant

6) City Hall

7) City Park Dept.

8) Gas Station

9) Automobile Plant

10) Business Office

11) School

12) Construction Co.

13) Telephone Co.

14) Police Dept.

Role Playing

I Roles:

- a) Interviewer(s)
- b) Interviewee (s) (applicants for job)
- c) Receptionist (secretary)

II Scene:

- a) Interviewers Office

III Preparation for Interview:

- a) Forms:
  - 1) Application of entrance into D.O. Program (already filled out)
  - 2) Application for Employment
  - 3) Math Skills Test (pp. 8-11)
- b) Entire class will fill out Employment Application
- c) Administer Math Skills Test
- d) Correct Test
- e) Fill in Raw Scores (First page of test)
- f) Fill in Rating Sheet
- g) Secretaries will file together (staple)
  - 1) D.O. Application
  - 2) Employment Application
  - 3) Math Skills Test
  - 4) Rating Sheet
- h) Interviewer will pick applicants at random.
  - 1) Narrow possible selection down to two or three applicants
  - 2) Applicants will compete for job by selecting their classmates to form teams.
  - 3) Team will compete in Math Games

ditto
available

APPLICATION FOR EMPLOYMENT

DATE ____________________

NAME	LAST	FIRST		MIDDLE
ADDRESS			NUMBER OF YEARS	PHONE NO
LAST PREVIOUS ADDRESS				NUMBER OF YEARS

(Leave blank)	SOCIAL SECURITY NO.	SEX	HEIGHT	WEIGHT

PHYSICAL DEFECTS	GLASSES ☐	OTHER (EXPLAIN)

SINGLE ☐	MARRIED ☐	DIVORCED ☐	SEPARATED ☐	WIDOWED ☐	NO. CHILDREN	NO. DEPENDENTS

RESIDENCE	WITH PARENTS ☐	RENT ☐	BOARD ☐	OWN HOME ☐	

FAMILY DATA	OCCUPATION	ADDRESS—IF DECEASED SO INDICATE
FATHER'S NAME		
MOTHER'S NAME		
HUSBAND OR WIFE		
DEPENDENTS		

PERSONAL REFERENCES—OTHER THAN RELATIVES OR EMPLOYERS

NAME	ADDRESS	YRS. ACQUAINTED	OCCUPATION
1			
2			
3			

(Over)

MATH SKILLS

DO NOT WRITE BELOW THIS LINE

TEST SCORE		REMARKS
+ W.N.	x W.N.	
+ F	x F	
+ D	x D	
- W.N.	÷ W.N.	
- F	÷ F	
- D	÷ D	

APPLICATION APPROVED	
EFFECTIVE	
SALARY	PER MO.
DEPARTMENT	
EMPLOYEE NO.	

Form [illegible]

EDUCATION AND EXPERIENCE

SCHOOL	NAME OF SCHOOL	DATE		SUBJECT OF SPECIALIZATION	GRADUATED YES · NO	DEGREE
		FROM	TO			
HIGH OR PREP						
COLLEGE						
BUSINESS						
OTHER						

EMPLOYER'S NAME & ADDRESS	TYPE OF WORK	DATES		SALARY	REASON FOR LEAVING
		FROM	TO		
LAST					
PREVIOUS					
PREVIOUS					

MILITARY SERVICE BRANCH	DATE		SPECIAL DUTIES OR TRAINING	PRESENT RESERVE STATUS
	FROM	TO		

SPECIAL QUALIFICATIONS

TYPING ☐ W. P. M. | SHORTHAND ☐ W. P. M. | ACCTNG. ☐ NO. OF SEMESTERS

BUSINESS MACHINES (Specify)

SALARY EXPECTED	WHAT LED YOU TO SEEK EMPLOYMENT HERE?

SIGNED ....

[illegible] -available

Name ____________________

Date ____________________

RAW SCORES: (Number Correct)

Addition:

Whole Numbers_____

Fractions _______

Decimals _______

Subtraction:

Whole Numbers _____

Fractions _________

Decimals _________

Multiplication:

Whole Numbers ____

Fractions _______

Decimals ________

Division:

Whole numbers_____

Fractions _______

Decimals ________

Add:

1) 34
22
14
+ 20
90

2) 387
219
+ 5318
5924

3) 418
32976
+ 1287509
1320903

4) 312 + 193 =
505

5) 38
512
34
+ 120
704

6) $\frac{1}{2}$
$\frac{1}{4}$
+ $\frac{3}{4}$
$\frac{6}{4}$ or $1\frac{1}{2}$

7) $\frac{3}{8}$
$\frac{5}{12}$
$\frac{3}{4}$
+ $\frac{1}{2}$
$\frac{49}{24}$ or $2\frac{1}{24}$

8) $\frac{1}{2}$
$\frac{3}{5}$
+ $\frac{7}{10}$
$\frac{36}{20} = 1\frac{16}{20} = 1\frac{4}{5}$

ditto available

Add:

9) $\frac{3}{5} + \frac{7}{10} + \frac{1}{2} = \frac{18}{10} = 1\frac{4}{5}$

10) $\frac{5}{6}$
$\frac{3}{8}$
$+ \frac{1}{2}$
$\frac{41}{24} = 1\frac{17}{24}$

11) .15
.34
+ .64
1.13

12) .34 + 2.17 + 48 = 2.99

13) 8.9
32.91
.0078
+ 9256
9297.8178

14) 7892.74
+ .45189
7893.19189

15) 45.1 + 6.78925 = 51.88925

Subtract:

16) 794
- 561
233

17) 8213
- 947
7266

18) 723411 - 89725 =
633686

19) 312
- 193
119

20) Take 34 from 87
53

21) $4\frac{1}{2}$
$- \frac{1}{2}$
4

22) $3\frac{1}{4}$
$- \frac{3}{8}$
$2\frac{7}{8}$

23) $7\frac{1}{4}$
$- 5\frac{15}{32}$
$1\frac{25}{32}$

24) $25\frac{1}{8}$
$- 12\frac{5}{24}$
$12\frac{22}{24} = 12\frac{11}{12}$

25) $\frac{7}{16}$
$- \frac{3}{8}$
$\frac{1}{16}$

26) 4.318
- 2.206
2.112

27) 578
- 32.1
545.9

28) .62
-.15
.47

29) 45.1
- 6.78925
38.31075

30) 31.18 - 9.75 = 21.43

ditto available

Multiply:

31) 584 × 3 = 1952

32) 382 x 14 = 5348

33) 326 × 407 = 132682

34) 314 × 25 = 7850

35) 458 × 13 = 5954

36) $\frac{1}{2} \times 4 = 2$

37) $\frac{3}{4} \times \frac{4}{9} = \frac{1}{3}$

38) $\frac{3}{8} \times \frac{2}{3} = \frac{1}{4}$

39) $\frac{2}{3} \times \frac{3}{5} \times \frac{1}{10} = \frac{1}{25}$

40) $\frac{5}{6} \times \frac{3}{8} \times \frac{1}{10} \times \frac{1}{2} = \frac{1}{96}$

41) 314 × .5 = 157.0

42) 1.2 × .07 = .084

43) 2.72 x 43 = 116.96

44) 18.7 x .0058 = .10846

45) 2.31 x 6.4 = 14.784

dibu. cavaular

Divide:

46) 8)1969 $246\frac{1}{8}$

47) 16)672 42

48) 43)301 7

49) 342)568759 $1663\frac{13}{342}$

50) 2585 ÷ 5 = 517

51) $\frac{1}{2} \div \frac{1}{4}$ = 2.

52) $\frac{3}{8} \div \frac{7}{16}$ $\frac{6}{7}$

53) $3\frac{1}{2} \div \frac{3}{72}$ = 84

54) $\frac{5}{9}\overline{)6\frac{1}{5}}$ $\frac{369}{25} = 14\frac{19}{25}$

55) $\frac{3}{4} \div \frac{5}{9}$ = 1 20

56) .5)25.85 51.7

57) 2.3)552 240.

58) $75.69 ÷ 18.4 $4.1\frac{250}{184}$

) 1.6)6.72 4.2

60) 342)568759 $1\,663\frac{13}{342}$

11

ditto -
available

Diversified Occupations Students' Rating Sheet

Student ______________________________ Date ____________

Teacher ______________________________

To Interviewer ______________________

* Use of (Key) on next page:

Rating Sheet

	Excellent	Above Average	Average	Below Average	Poor
Neatness					
Courtesy					
Promptness					
Hard Worker					
Addition:					
Whole Number					
Fractions					
Decimal					
Subtraction					
Whole Number					
Fractions					
Decimal					
Multiplication					
Whole Numbers					
Fractions					
Decimals					
Division					
Whole Numbers					
Fractions					
Decimals					
Ability to get along with others					

REMARKS: ________________________________

Signed ______________

Key to Rating Sheet
(Mathematics)

The "Math Skills Test" is divided in twelve (12) parts; These are addition, subtraction, multiplication, and division problems for each of three kinds of numbers: whole number, fractions and decimals. There are five problems in each part.

Examples:

Addition:

Whole Numbers	(5 problems)
Fractions	(5 problems)
Decimals	(5 problems)

Rating Sheet

	Excellent	Above Average	Average	Below Average	Poor
Addition					
Whole Numbers	✓				
Fractions		✓			
Decimals					

If you get all five (5) correct for a particular part, say addition of whole numbers, you are rated "Excellent".

If you get four correct for a particular part, say addition of fractions, you are rated "Above Average".

And so on . . . .

MATHEMATICAL GAMES

1) Equivalent Fractions:

Select a Recorder(s) and Timer

Write a "Lowest Term" fraction on the chalkboard

Have each team name as many equivalent fractions as they can in one minute. (Teams recite individually)

Score:

One point for each fraction not repeated.

2) Operational Skills:

Duplicate "Talley Sheet" to be passed from one member of each team to the next.

Example:

Talley Sheet
Start with
Number 8
1 13
2 10

Give each member of each team a card with a number on it preceeded by a sign of operation

Examples:

+5	-3	x $\frac{1}{2}$	+4

You can make up these cards in two sets

Each corresponding member of each team will receive the same card (or you may use flash cards)

Each member of a team will perform the operation that is on his card.

Mathematical Games continued:

The team with the correct answer first, wins.

Score:

Vary the number of points to correspond with the difficulty of the set of cards.

These games can be modified to cover any aspect of arithmetic that you want.

You can make use of "Flash Cards"

der
available

After being tested, interviewed and hired, you must fill out the following forms in order that your employer will be able to make the correct deductions for Federal and State Income Taxes from your gross pay.

FORM W-4 (Rev. Jan. 1967)
U.S. Treasury Department
Internal Revenue Service

EMPLOYEE'S WITHHOLDING EXEMPTION CERTIFICATE

Type or print full name ________________ Social Security Number ________________

Home address ________________ City ________________ State ________________ ZIP code ________________

EMPLOYEE: File this form with your employer. Otherwise, he must withhold U.S. income tax from your wages without exemption.

EMPLOYER: Keep this certificate with your records. If the employee is believed to have claimed too many exemptions, the District Director should be so advised.

HOW TO CLAIM YOUR WITHHOLDING EXEMPTIONS

1. If SINGLE (or if married and wish withholding as single person), write "1." If you claim no exemptions, write "0" . . . ______
2. If MARRIED, one exemption each is allowable for husband and wife if not claimed on another certificate.
   (a) If you claim both of these exemptions, write "2"; (b) If you claim one of these exemptions, write "1"; (c) If you claim neither of these exemptions, write "0" . . . . ______
3. Exemptions for age and blindness (applicable only to you and your wife but not to dependents):
   (a) If you or your wife will be 65 years of age or older at the end of the year, and you claim this exemption, write "1"; if both will be 65 or older, and you claim both of these exemptions, write "2" . . . . ______
   (b) If you or your wife are blind, and you claim this exemption, write "1"; if both are blind, and you claim both of these exemptions, write "2" . . . . ______
4. If you claim exemptions for one or more dependents, write the number of such exemptions. (Do not claim exemption for a dependent unless you are qualified under Instruction 4 on other side.). . . . . ______
5. If you claim additional withholding allowances for itemized deductions fill out and attach Schedule A (Form W-4), and enter the number of allowances claimed (if claimed file new Form W-4 each year) . . . . ______
6. Add the exemptions and allowances (if any) which you have claimed above and write total . . . . ☐
7. Additional withholding per pay period under agreement with employer. (See Instruction 1.) . . . . $

I CERTIFY that the number of withholding exemptions claimed on this certificate does not exceed the number to which I am entitled. o48—16—79081-1

(Date) ________________, 19____ (Signed) ________________

Form W 4
State Tax Department

STATE OF DELAWARE

EMPLOYEE'S WITHHOLDING EXEMPTION CERTIFICATE

(Collection of Delaware Income Tax at Source on Wages)

Print Full Name . . . . Social Security No. . . . .

Print Home Address . . . .

HOW TO CLAIM YOUR WITHHOLDING EXEMPTIONS

1 Every taxable is entitled to one exemption. If you claim it, write the figure "1". . . . . ______

2 If you are married, one exemption is allowable for wife or husband if spouse does not claim an exemption on a withholding exemption certificate. If you claim the exemption write the figure "1". . . . . ______

3 One exemption is allowable for each dependent whose gross income for the calendar year is less than $600.00. . . ______

4 Additional exemptions for age and blindness:
(a) If you or your wife will be 65 years of age or older at the end of the year and you claim the exemption, write the figure "1"; if both will be 65 or older at the end of the year and you claim both of the exemptions write the figure "2". . . . . ______
(b) If you or your wife are blind and you claim this exemption have the figure "1" written; if both are blind and you claim both of these exemptions, have the figure "2" written . . . .

5. Add the number of exemptions which you have claimed above and write the total . . . . ☐

I CERTIFY that the number of withholding exemptions claimed on this certificate does not exceed the number to which I am entitled.

(Date) . . . . 19 . . . . (Signed) . . . .

You have been hired as a Sales Clerk in a large department stor

Your "Rate of Pay" is $1.75 per hour

A Sales Clerk has the following responsibilities:

a) Punching his/her Time Card

b) Writing up Sales Slips

c) Making Change

As an employee, not only do you have a responsibility to your employer, but you also have a responsibility to yourself. You should be able to compute:

a) Your Gross Pay (based on your hourly wage)

b) Your Total Deduction

c) Your Net Pay

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PUNCHING THE TIME CLOCK

NO. 54
NAME Tom Jones
WEEK ENDING Oct. 10, 1969

DAYS	MORNING IN	MORNING OUT	AFTERNOON IN	AFTERNOON OUT	HOURS
M	8⁰⁴	12⁰¹	12⁴⁸	4³²	$7\frac{1}{4}$
T	7⁵⁴	12⁰²	12⁵²	3⁵⁸	$6\frac{3}{4}$
W	7⁵⁸	11³⁰	12⁵⁴	4³⁶	7
TH	7⁵⁹	12⁰³	1²⁸	431	7
F	7⁴⁶	12⁰²	12⁴⁹	4³⁰	$7\frac{1}{2}$

TOTAL HOURS $35\frac{1}{2}$ RATE $1.75

TOTAL EARNINGS $62.13

The expression "punching the clock" means movement of a knob attached to a clock in order to record the time at that moment.

An employee is required to punch the clock each morning when he reports to work and each evening when he goes home. In fact, if he goes out of the building for lunch he is required to record this by punching the clock when he leaves and when he returns.

Time worked is recorded in hours and quarter hours. Any time less than a quarter hour is not considered. No credit is given for coming early or leaving late.

Thus, on Monday, on Tom's time card,

8:04 was treated as 8:15; 12:01 as 12:00

12:48 as 1:00 and 4:32 as 4:30; Total hours 7 $\frac{1}{4}$

On Tuesday 7:54 was treated as 8:00; 12:02 as 12:00

12:52 as 1:00 and 3:58 as 3:45; Total hours 6 $\frac{3}{4}$

Explain the adjustment in time for Wednesday, Thursday and Friday.

Wed - 7:58 treated as 8:00
11:30 treated as 11:30
12:54 treated as 1:00
4:36 treated as 4:30

Thurs - 7:59 treated as 8:00
12:03 treated as 12:00

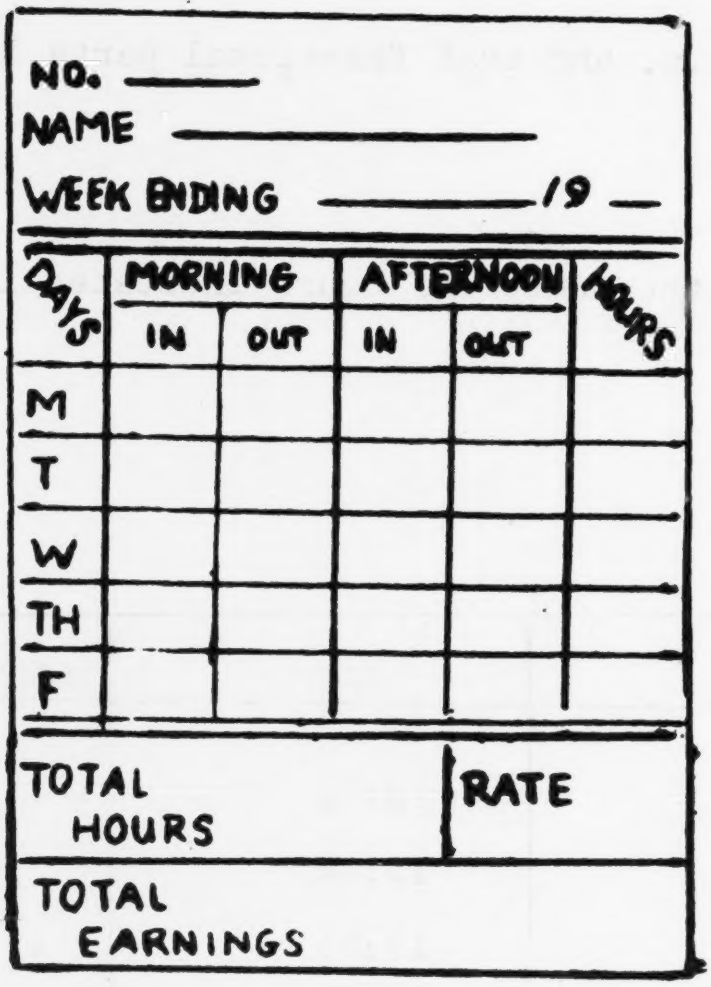
POOR ORIGINAL COPY - BEST
AVAILABLE AT TIME FILMED

Assume that regular store hours are from 8 a.m. to 12 noon and from 1 p.m. to 5 p.m. and that fractional parts less than $\frac{1}{4}$ hours are not considered.

1 Copy and state the number of hours indicated in each of the following:

IN	OUT	NUMBER OF HOURS
7:59	12:01	4
7:4[illegible]	12:02	4
7:50	12:05	4
7:59	12:03	4
1:00	5:02	4
12:58	4:03	3
1:11	5:06	$3\frac{3}{4}$
12:54	3:33	$2\frac{1}{2}$
9:10	12:04	$2\frac{3}{4}$
1:18	5:04	$3\frac{1}{2}$
8:10	11:40	$3\frac{1}{4}$
12:49	4:20	$3\frac{1}{4}$

Your Time Card



NO. ____

NAME ____________

WEEK ENDING __________ 19 __

DAYS	MORNING		AFTERNOON		HOURS
	IN	OUT	IN	OUT	
M					
T					
W					
TH					
F					

TOTAL HOURS	RATE
TOTAL EARNINGS	

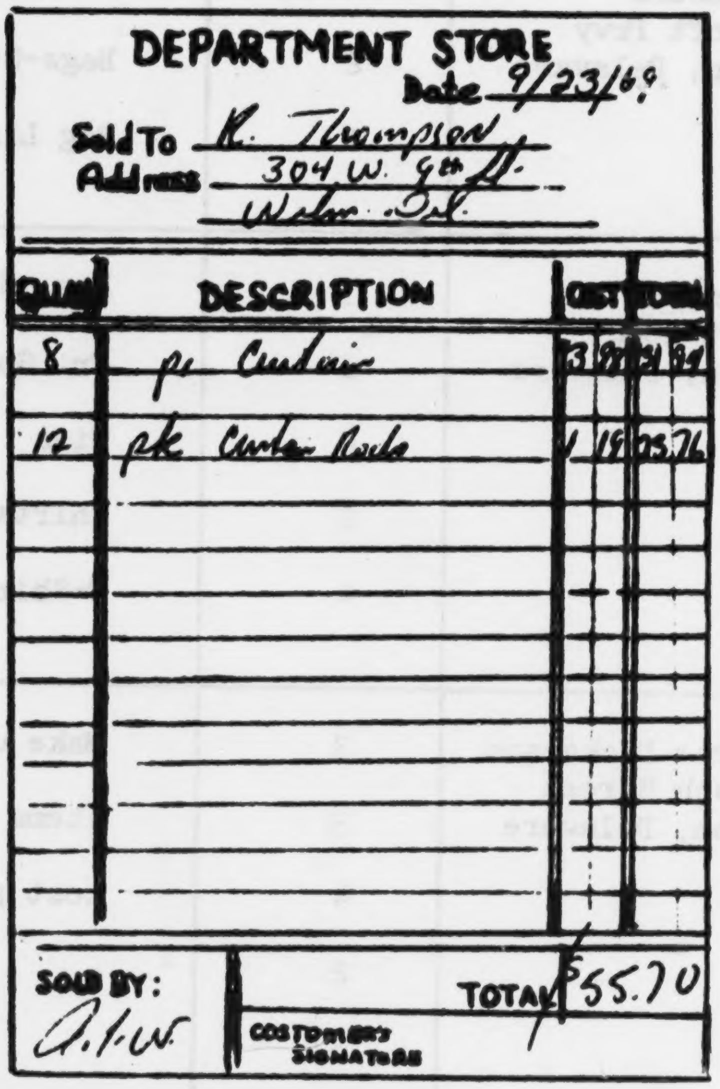
Draw the above time card and fill in completely using the times given below:

Store hours: 8 a.m. to 12 noon - 1 p.m. to 5 p.m.

MORNING		AFTERNOON		
In	Out	In	Out	
8:00	12:02	1:00	5:00	8 hrs
7:59	12:01	1:00	4:00	7 hrs
8:06	12:00	1:00	3:00	5 3/4 hrs
8:09	12:01	12:58	5:03	7 3/4 hrs
8:03	12:02	1:00	4:30	7 1/4 hrs

Writing Up Sales Slips

A sales clerk must be very good at multiplication and addition. In completing a sales slip on which he must compute the total cost of 8 pairs of curtains at $3.98 per pair and 12 packages of curtain rods at $1.19 per package he must be able to multiply and add correctly.



DEPARTMENT STORE

Date 9/23/69

Sold To R. Thompson

Address 304 W. 9th St.

Wilm. Del.

QUAN.	DESCRIPTION	COST	TOTAL
8	pr Curtains	3 98	31 84
12	pk Curtain Rods	1 19	23 76

SOLD BY: A.I.W.

TOTAL $55.70

CUSTOMER'S SIGNATURE

A. **Draw a sales slip for each customer and write up the following purchases:**

1) Customer	Quantity	Description	Cost Per Item	
Mrs. Ruth Barksdale 904 Clayton Street Wilmington, Delaware	8	Stocking	$ 1.00	#8.00
	3	Slips	2.59	7.77
	1	Hand Bag	10.50	10.50
			total	$26.27
2) Mr. J. Ashburn 204 Bancroft Pkwy Wilmington, Delaware	1	Water Hose	$ 4.95	$4.95
	2	Bags-Grass Seed	1.50	$3.00
	1	Bag Lime	2.50	#2.50
			total	$10.45
3) Mr. R. Kempski 407 duPont Road Wilmington, Delaware	3	Prs. Socks	$ 1.00	#3.00
	1	Pr. Shoes	15.95	15.95
	4	Ties	2.75	11.00
	2	Shirts	5.50	11.00
	4	T-Shirts	1.50	6.00
			total	#46.95
4) Mrs. Arlene Dickerson 1619 W. 4th Street Wilmington, Delaware	3	Make up the		
	3	items and the		
	4	cost per item.		
	2			
	5			
	1			
	2			

MAKING CHANGE

Discussion problem:

Tom bought 2 shirts at $3.50 each and gave the clerk a ten-dollar bill.

a) What was the total cost of his purchase? $7.00

b) How much change did he receive? $3.00

c) Tell how the clerk would make change using the least number of coins. 3, dollar bills

Cathy bought 6 pencils @ 4¢ each and 2 packs of paper @ 25¢ each. She gave the clerk a one-dollar bill.

a) What was the total cost of her purchase? 74¢

b) How much change did she receive? 26¢

c) Make change for Cathy using the least number of coins. 1 quarter + 1 penny

Mary bought 2 $\frac{1}{2}$ pounds of apples at 13¢ a pound, 3 cans of soup at 19¢ each and a box of crackers for 43¢. She paid for the purchase with a five-dollar bill.

a) What was the total cost of the purchase? $4.25

b) How much change did she receive? 75¢

c) How would you make change if you were the clerk? 3 quarters

Two points to remember when making change:

1) When handed a bill by the customer, keep the bill in full view while repeating the cost of the article and size of the bill ?

Cost of Article	**Am't Offered in Pay't**
$2.79	**$5.00**

Thus you say,

"$2.79 out of $5.00

2) In making change, use the largest bills and coins possible.

Note:

When making change you Add.

$2.79 out of $5.00 = $5 - $2.79

YOU THINK

$2.79 + n = $5.00

To make Change:

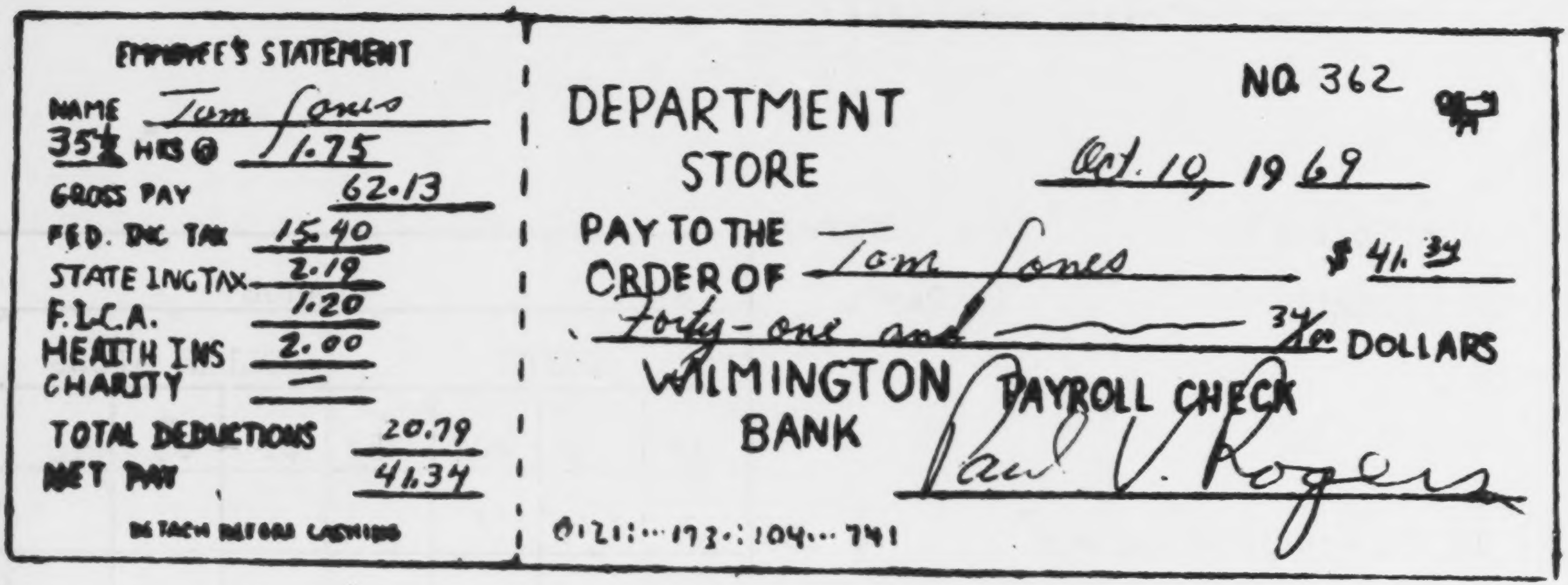
Add 1 penny to $2.79	$2.80
Add 2 dimes to $2.80	$3.00
Add 2 dollars to $3.00	$5.00

		CHANGE							
		COINS				DOLLAR BILLS			
Article Bought	Amt. Offered in Pay't	1¢	5¢	10¢	25¢	$1	$5	$10	Tot
1 Blouse @ $2.79	$5.00	1		2		2			221

Copy and change sheet on the right and show how you would give change for the following purchases:

Article(s) Bought	Am't Offered in Pay't	CHANGE							
		COINS				DOLLAR BILLS			
		1¢	5¢	10¢	25¢	$1	$5	$10	Total
1) 8 pencils @ 4¢ each;	$ .50	3	1	1					#.18
2) 1 pair shoes @ $14.37;	$15.00	3		1	2				.63
3) 1 coat @ $65.75; 1 suit @ $38.50;	$110.				3		1		5.75
4) 5yds. material @ $3.75 each:	$20				1	1			1.25
5) 238 gal. fuel oil @ 15¢ each	$60		1		1	4		2	24.30
6) 9 balls @ $1.85 each:	$40.00			1	1	3		2	23.35
7) 4 pairs stockings @ $1.25:	$10						1		5.00
8) 8 pairs curtains @ $3.29:	$30.00	3	1	1	2	3			3.68
9) 3 $\frac{1}{2}$ lbs. nails @ 20¢ a lb. and 1 hammer @ $3.50;	$5.00		1		3				.80
10) 9 storm windows @ $16.75 each and 2 storm doors @ $59.60 each;	$300.00		1					3	30.05
TOTAL		9	5	4	13	11	2	7	#94.99
		#.09	#.25	#.40	#3.25	#11.00	#10.00	#70.00	

Understanding Your Pay Check



EMPLOYEE'S STATEMENT

NAME	Tom Jones
35½ HRS @	1.75
GROSS PAY	62.13
FED. INC TAX	15.40
STATE INC TAX	2.19
F.I.C.A.	1.20
HEALTH INS	2.00
CHARITY	—
TOTAL DEDUCTIONS	20.79
NET PAY	41.34

DETACH BEFORE CASHING

NO. 362

DEPARTMENT STORE

Oct. 10, 1969

PAY TO THE ORDER OF Tom Jones $ 41.34

Forty-one and 34/100 DOLLARS

WILMINGTON BANK

PAYROLL CHECK

Paul V. Rogers

⑆121⑆173⑆104⑈741

This is a typical Pay Check

The Stub and The Check

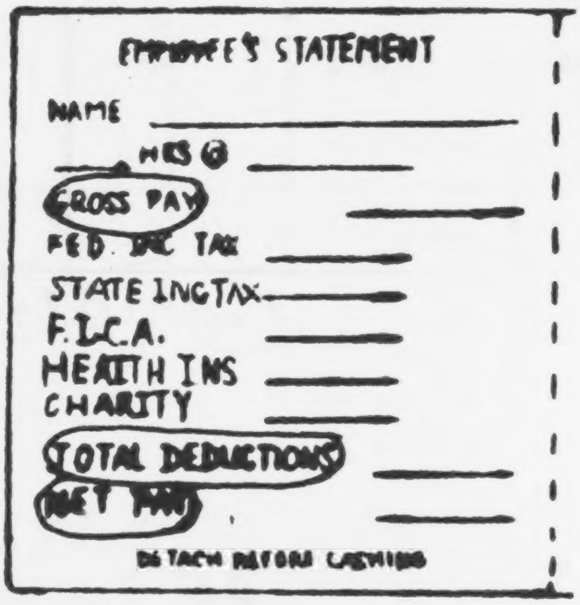
The Stub - you keep for your records

The Check - You can sign (on the back) and exchange for cash.

You separate the sub from the check by tearing along the dotted line.

The three (3) most important numbers on the stub are:

GROSS PAY - TOTAL DEDUCTIONS - NET PAY



EMPLOYEE'S STATEMENT

NAME __________

___ HRS @ __________

GROSS PAY __________

FED. INC TAX __________

STATE INC TAX __________

F.I.C.A. __________

HEALTH INS __________

CHARITY __________

TOTAL DEDUCTIONS __________

NET PAY __________

DETACH BEFORE CASHING

GROSS PAY - Amount earned before deductions

DEDUCTIONS - Each amount subtracted from gross pay

NET PAY - Amount you receive (take home pay)

Net Pay = Gross Pay minus total Deductions

N.P = G.P - T.P.

Which do you think is the larger

a) gross pay or deductions? gross pay

b) net pay or deductions? net pay

c) gross pay or net pay? gross pay

Which do you think are True and which are False?

1) Net and gross pay are always the same. F

2) Gross pay is usually larger than net pay. T

3) Take home pay is another way of saying gross pay. F

4) Net pay means the same as deductions F

5) Gross pay minus deductions equals net pay. T

6) You get to spend deductions. F

7) You get to spend net pay. T

8) You usually get to spend gross pay. F

There are two classifications of deduction, required and voluntary:

Required Deductions:

- Federal Income Tax
- State Income Tax
- Social Security (F.I.C.A.)

Voluntary Deductions:

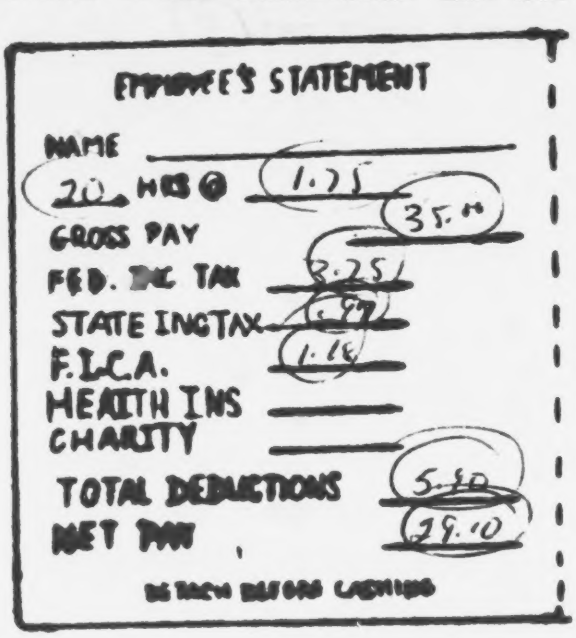
- Health Insurance
- Charity (Ex.: United Fund)
- Purchase of Share (If you work for a corporation)
- Credit Union

All deductions are reported on your pay stub. (Draw your own.)

Record the following information on this stub.

Number of Hours Worked	20
Hourly Wage	$1.75
Federal Income Tax	3.35
State Income Tax	.97
F. I. C. A.	1.18

Compute and record total Deductions and Net Pay.



EMPLOYEE'S STATEMENT

NAME ______
20 HRS @ 1.75
GROSS PAY 35.00
FED. INC TAX 3.25
STATE INC TAX .97
F.I.C.A. 1.18
HEALTH INS ______
CHARITY ______
TOTAL DEDUCTIONS 5.50
NET PAY 29.10

DETACH BEFORE CASHING

A Compute the Hourly Wage in each case:

Hours Worked	Gross Pay	
1) 23	$25.30	$1.10
2) 15	$24.75	$1.65
3) 39	$88.00	$2.26
4) 40	$90.00	$2.25

B 5) If your gross pay is $46.50 and your net pay is $34.47. What is the amount of total deductions?

C Compute the Net Pay in each case:

	Hours Worked	Hourly Wage	Fed. Tax	State Tax	F.I.C.A.	Health Ins.	Charity
6)	23	$1.75	$3.92	$1.01	$1.21	$ .54	$2.00
7)	15	$1.45	$1.98	$ .84	$ .92	$ .54	
8)	40	$2.00	$13.00	$2.46	$2.36	$1.50	$2.50
9)	43	$3.50	$23.00	$4.57	$3.00		
10)	10	$1.50	$1.17	$ .55	$ .84		

6) $31.57
7) $16.02
8) $58.18
9) $116.43
10) $12.44

Practice Problems:

Add:

A

1) 23
31
24
78

2) 41
16
27
84

3) 23
45
58
126

4) 35
42
73
150

5) 214
241
422
877

6) 327
235
114
676

7) 347
256
172
775

8) 287
157
314
758

9) 671
328
416
1415

10) 457
729
514
1700

11) 68
8
2904
463
67
3510

12) 37
1456
5
583
85
2166

13) 96834
4
4856
87
65
101846

B

14) 18793
9345
27
275
28440

15) 9706
238
98636
459
109039

16) 3717
68
729
50
49638
54202

17) 493865
572896
617829
1684590

C

18) 23 + 61 + 97 + 10 191
19) 9 + 169 + 3473 3651
20) 238 + 77 + 54278 54593
21) 7932 + 417 + 97 + 369480 377926
22) 2314 + 20314 + 200314 + 2000314 2223256
23) 27 + 728 + 4297 + 36 5088
24) 6371 + 36948 + 42 + 7389000 7432361
25) 27 + 8 + 142 177
26) 451 + 32897041 32897492
27) 32 + 8 + 80018 80058
28) 32479 + 19 + 900 33398
29) 491 + 90007 + 82 90580
30) 9 + 9007 + 900083 909099
31) 1781 + 9 + 800087 801877

Practice Problems :

Subtract

A
1) 4694 - 381 4313
2) 7859 - 647 7212
3) 8947 - 6873 2101
4) 3815 - 1747 2068

5) 51925 - 4758 47167
6) 34519 - 18742 15777
7) 56987 - 8998 47989
8) 7251 - 431 6820
9) 38651 - 9784 28867

10) 589 - 374 215
11) 873 - 751 122
12) 3498 - 872 2626
13) 6782 - 5695 1087
14) 7813 - 5658 2155
15) 3172 - 998 2174
16) 2357 - 1598 759
17) 7814 - 957 6857
18) 1437 - 659 778

B
19) From 492 take 80 412
20) From 947 take 725 222
21) Take 317 from 849 532
22) From 6712 take 3541 3171
23) From 1000 take 524 476
24) From 5281 take 794 4487
25) Take 1250 from 2000 750
26) From 35000 take 32974 2026

C Find the difference between:
27) 845 and 731 114
28) 937 and 512 425
29) 314 and 478 164
30) 2317 and 892 1425
31) 700 and 1214 514
32) 3215 and 8714 5499
33) 4000 and 3678 322
34) 200 and 1136 936
35) 100000 and 92458 7542

Practice Problems:

A Multiply

1) 46 x 7 = 322
2) 83 x 9 = 747
3) 48 x 32 = 1536
4) 341 x 75 = 25575
5) 392 x 64 = 25088
6) 819 x 47 = 38 493
7) 612 x 345 = 211140
8) 893 x 215 = 191995
9) 371 x 209 = 77539
10) 587 x 630 = 369810
11) 906 x 324 = 293544
12) 5683 x 724 = 414492

B Multiply by sight:

13) 417 x 10 4170
14) 417 x 100 41700
15) 417 x 1000 417000
16) 52681 x 10 526810
17) 100 x 3482 348200
18) 61297 x 10 612970
19) 1000 x 349 349000
20) 2316 x 1000 2316000
21) 3900 x 10 39000
22) 21500 x 100 2150000
23) 3470000 x 10 34700000
24) 30000000 x 1000 30000000000

C Find the product:

25) 3 x 4 x 6 72
26) 5 x 2 x 8 80
27) 11 x 3 x 7 240
28) 16 x 8 x 3 0
29) 16 x 32 x 0 320
30) 32 x 2 x 5 165
31) 11 x 5 x 3 165
32) 20 x 5 x 10 1000
33) 15 x 6 x 18 0
34) 27 x 3 x 1 81
35) 0 x 82 x 35 0
36) 8 x 15 x 8 x 3 7680

Practice Problems:

A Divide:

1) $\begin{array}{r} 3 \\ 6\overline{)18} \end{array}$ 2) $\begin{array}{r} 7 \\ 9\overline{)63} \end{array}$ 3) $\begin{array}{r} 7 \\ 8\overline{)56} \end{array}$ 4) $\begin{array}{r} 23 \\ 4\overline{)92} \end{array}$

5) $\begin{array}{r} 133 \\ 5\overline{)665} \end{array}$ 6) $\begin{array}{r} 209 \\ 3\overline{)627} \end{array}$ 7) $\begin{array}{r} 93 \\ 6\overline{)858} \end{array}$ 8) $\begin{array}{r} 82 \\ 4\overline{)328} \end{array}$

9) $\begin{array}{r} 13781 \\ 6\overline{)82686} \end{array}$ 10) $\begin{array}{r} 1197 \\ 7\overline{)8379} \end{array}$ 11) $\begin{array}{r} 5483 \\ 8\overline{)43864} \end{array}$ 12) $\begin{array}{r} 10302 \\ 9\overline{)92718} \end{array}$

B 13) $\begin{array}{r} 11 \\ 14\overline{)154} \end{array}$ 14) $\begin{array}{r} 21 \\ 17\overline{)357} \end{array}$ 15) $\begin{array}{r} 11 \\ 19\overline{)209} \end{array}$

16) $\begin{array}{r} 7 \\ 87\overline{)609} \end{array}$ 17) $\begin{array}{r} 32 \\ 26\overline{)832} \end{array}$ 18) $\begin{array}{r} 2 \\ 32\overline{)9472} \end{array}$

19) $\begin{array}{r} 296 \\ 43\overline{)93420} \end{array}$ 20) $\begin{array}{r} 358 \\ 231\overline{)82698} \end{array}$

Practice Problems:

C **Divide:**

21) 405 ÷ 5 81

22) 4016 ÷ 2 2008

23) 70132 ÷ 8 $8766\frac{1}{2}$

24) 660 ÷ 20 33

25) 4302 ÷ 90 $37\frac{36}{45}$

26) 60544 ÷ 344 117 R 296

27) $\frac{16}{8}$ 3

28) $\frac{252}{12}$ 21

29) $\frac{47133}{9}$ $5233\ 3\frac{2}{3}$

30) $\frac{1992}{83}$ 24

31) $\frac{1442}{103}$ 14

32) $\frac{540}{45}$ 12

33) $\frac{54300}{150}$ 362

34) $\frac{710907}{703}$ 1011 R 174

Practice Problems:

A Fill in the missing number:

1) $\frac{1}{3} = \frac{2}{6}$
2) $\frac{1}{4} = \frac{3}{12}$
3) $\frac{1}{5} = \frac{5}{25}$
4) $\frac{1}{6} = \frac{5}{30}$
5) $\frac{2}{3} = \frac{10}{15}$.
6) $\frac{3}{4} = \frac{15}{20}$
7) $\frac{3}{8} = \frac{9}{24}$
8) $\frac{4}{5} = \frac{40}{50}$
9) $\frac{5}{12} = \frac{20}{48}$
10) $\frac{7}{8} = \frac{42}{48}$
11) $\frac{3}{10} = \frac{300}{1000}$
12) $\frac{5}{16} = \frac{25}{80}$

Reduce to Lowest terms:

13) $\frac{3}{9}$ $\frac{1}{3}$
14) $\frac{4}{8}$ $\frac{1}{2}$
15) $\frac{4}{10}$ $\frac{2}{5}$
16) $\frac{5}{15}$ $\frac{1}{3}$
17) $\frac{6}{30}$ $\frac{1}{5}$
18) $\frac{4}{16}$ $\frac{1}{4}$
19) $\frac{4}{14}$ $\frac{2}{7}$
20) $\frac{10}{25}$ $\frac{2}{5}$
21) $\frac{6}{15}$ $\frac{2}{5}$
22) $\frac{10}{32}$ $\frac{5}{16}$
23) $\frac{6}{9}$ $\frac{2}{3}$
24) $\frac{6}{16}$ $\frac{3}{8}$

Change to improper fractions:

25) $2\frac{1}{4}$ $\frac{9}{4}$
26) $1\frac{3}{5}$ $\frac{8}{5}$
27) $4\frac{2}{3}$ $\frac{14}{3}$
28) $3\frac{1}{8}$ $\frac{25}{8}$
29) $8\frac{4}{9}$ $\frac{76}{9}$
30) $5\frac{7}{8}$ $\frac{47}{8}$
31) $6\frac{2}{3}$ $\frac{20}{3}$
32) $10\frac{1}{25}$ $\frac{251}{25}$
33) $7\frac{5}{12}$ $\frac{89}{12}$
34) $9\frac{5}{11}$ $\frac{104}{11}$
35) $10\frac{1}{3}$ $\frac{31}{5}$
36) $12\frac{3}{8}$ $\frac{99}{8}$
37) $5\frac{3}{16}$ $\frac{83}{16}$
38) $7\frac{1}{5}$ $\frac{36}{5}$
39) $3\frac{9}{10}$ $\frac{39}{10}$
40) $8\frac{5}{32}$ $\frac{261}{32}$

Practice Problems:

A Add:

1) $\begin{array}{r}\frac{1}{5}\\ \frac{1}{5}\\ \hline \frac{2}{5}\end{array}$

2) $\begin{array}{r}\frac{3}{5}\\ \frac{4}{5}\\ \hline 1\frac{2}{5}\end{array}$

3) $\begin{array}{r}\frac{5}{12}\\ \frac{11}{12}\\ \hline 1\frac{1}{3}\end{array}$

4) $\begin{array}{r}9\frac{3}{8}\\ 7\frac{7}{8}\\ \hline 17\frac{1}{4}\end{array}$

5) $\begin{array}{r}7\frac{1}{16}\\ 3\frac{15}{16}\\ \hline 11\end{array}$

Subtract:

6) $\begin{array}{r}\frac{2}{3}\\ -\frac{1}{3}\\ \hline \frac{1}{3}\end{array}$

7) $\begin{array}{r}\frac{4}{5}\\ -\frac{1}{5}\\ \hline \frac{3}{5}\end{array}$

8) $\begin{array}{r}7\frac{9}{16}\\ -3\frac{5}{16}\\ \hline 4\frac{1}{4}\end{array}$

9) $\begin{array}{r}11\\ -\frac{7}{12}\\ \hline 10\frac{5}{12}\end{array}$

10) $\begin{array}{r}8\\ -5\frac{5}{16}\\ \hline 2\frac{13}{16}\end{array}$

B Write the "Least Common denominator for each set of fractions:

11) $\{\frac{1}{2}, \frac{1}{6}\}$ 6
12) $\{\frac{3}{7}, \frac{2}{3}\}$ 21
13) $\{\frac{7}{8}, \frac{1}{3}\}$ 24
14) $\{\frac{2}{5}, \frac{3}{7}\}$ 35
15) $\{\frac{1}{4}, \frac{2}{5}\}$ 20
16) $\{\frac{1}{4}, \frac{9}{10}\}$ 20
17) $\{\frac{5}{8}, \frac{1}{6}\}$ 24
18) $\{\frac{2}{3}, \frac{1}{6}\}$ 6
19) $\{\frac{4}{15}, \frac{7}{30}\}$ 30
20) $\{\frac{3}{8}, \frac{1}{12}\}$ 24
21) $\{\frac{4}{15}, \frac{1}{2}\}$ 30
22) $\{\frac{7}{16}, \frac{5}{32}\}$ 32
23) $\{\frac{1}{5}, \frac{4}{9}\}$ 45
24) $\{\frac{3}{7}, \frac{11}{21}\}$ 21
25) $\{\frac{1}{3}, \frac{1}{2}, \frac{5}{6}\}$ 6
26) $\{\frac{1}{4}, \frac{3}{8}, \frac{5}{12}\}$ 24
27) $\{\frac{2}{3}, \frac{3}{4}, \frac{1}{2}, \frac{5}{6}\}$ 12

Practice Problems:

A Add:

1) $\frac{1}{2}$
$+ \frac{1}{3}$
$\frac{5}{6}$

2) $\frac{1}{3}$
$+ \frac{3}{4}$
$1\frac{1}{12}$

3) $\frac{1}{4}$
$\frac{1}{3}$
$+ \frac{1}{2}$
$1\frac{1}{12}$

4) $3\frac{1}{3}$
$+ 5\frac{1}{6}$
$8\frac{5}{6}$

5) $3\frac{7}{10}$
$8\frac{1}{2}$
$+ 5\frac{3}{4}$
$17\frac{19}{20}$

6) $8\frac{3}{5}$
$+ 4\frac{5}{8}$
$13\frac{19}{20}$

7) 18
$3\frac{1}{4}$
$+ \frac{5}{6}$
$22\frac{1}{12}$

8) $9\frac{1}{3}$
$5\frac{5}{9}$
$+ 5\frac{3}{5}$
$18\frac{8}{9}$

9) $7\frac{1}{4}$
$+ 11\frac{3}{5}$
$18\frac{8}{9}$

10) $7\frac{1}{4}$
$3\frac{1}{2}$
$+5\frac{3}{5}$
$16\frac{1}{20}$

Subtract:

11) $\frac{5}{6}$
$- \frac{1}{2}$
$\frac{1}{3}$

12) $\frac{3}{4}$
$- \frac{2}{3}$
$\frac{1}{12}$

13) $\frac{3}{5}$
$- \frac{5}{8}$
$\frac{1}{40}$

14) $7\frac{2}{3}$
$- 5\frac{4}{9}$
$2\frac{2}{9}$

15) $9\frac{1}{5}$
$- 6\frac{7}{10}$
$2\frac{1}{2}$

Practice Problems:

A Multiply:

1) $\frac{1}{2} \times 8$ 4

2) $\frac{1}{2} \times 24$ 8

3) $\frac{3}{4} \times 12$ 9

4) $\frac{5}{6} \times 36$ 30

5) $\frac{3}{10} \times 20$ 6

6) $\frac{5}{11} \times 44$ 20

B 7) $\frac{1}{2} \times \frac{1}{3}$ $\frac{1}{6}$

8) $\frac{1}{4}$ $\frac{3}{8}$ $\frac{3}{32}$

9) $\frac{5}{12} \times \frac{3}{5}$ $\frac{1}{4}$

10) $8 \times \frac{11}{16}$ $5\frac{1}{2}$

11) $\frac{7}{10} \times \frac{1}{7}$ $\frac{1}{10}$

12) $\frac{4}{5} \times \frac{10}{18}$ $\frac{4}{9}$

C

13) $5\frac{1}{2} \times \frac{2}{5}$ $2\frac{1}{5}$

14) $3\frac{1}{4} \times \frac{4}{9}$ $1\frac{4}{9}$

15) $\frac{7}{10} \times 3\frac{3}{7}$ $2\frac{14}{35}$

16) $18\frac{1}{2} \times 4\frac{1}{4} \times \frac{3}{8}$ $29\frac{31}{64}$

17) $2\frac{1}{3} \times \frac{3}{10}$ $\frac{21}{30}$

18) $4\frac{1}{5} \times 12\frac{1}{2}$ $46\frac{3}{4}$

19) $1500 \times \frac{1}{100} \times \frac{3}{5}$ 9

20) $2\frac{3}{5} \times 1\frac{1}{2} \div 2$ $1\frac{11}{20}$

Practice Problems:

A Divide:

1) $\frac{3}{5} \div \frac{3}{5}$ 1

2) $\frac{3}{4} \div \frac{3}{8}$ 2

3) $\frac{7}{8} \div \frac{5}{16}$ $3\frac{4}{5}$

4) $15 \div \frac{5}{6}$ 18

5) $27 \div 2\frac{1}{4}$ 12

6) $12 \div 4\frac{4}{5}$ $2\frac{1}{2}$

7) $1\frac{1}{8} \div \frac{9}{24}$ 3

8) $8\frac{3}{4} \div 35$ $\frac{1}{4}$

9) $9\frac{8}{16} \div 9\frac{5}{16}$ 1

10) $70 \div 4\frac{3}{8}$ 16

11) $44 \div 1\frac{2}{5}$ $31\frac{3}{7}$

12) $2\frac{2}{3} \div 1\frac{7}{8}$ $1\frac{19}{45}$

13) $4\frac{13}{16} \div 1\frac{12}{32}$ $3\frac{1}{2}$

14) $\frac{7}{8} \times \frac{4}{9} \div \frac{5}{56}$ $4\frac{16}{45}$

Practice Problems:

A Write as decimals:

1) $\frac{1}{10}$ .1
2) $\frac{7}{100}$ .07
3) $\frac{29}{100}$ .29
4) $\frac{67}{1000}$ .067
5) $\frac{3}{1000}$ .003
6) $\frac{217}{1000}$ .217
7) $\frac{9}{10000}$ .0009
8) $\frac{6}{100}$ .06
9) $\frac{152}{1000}$ .152
10) $\frac{1}{10000}$ .0001
11) $\frac{328}{1000}$ .328
12) $\frac{4161}{10000}$ .4161

Write as common fractions:

13) .2 $\frac{2}{10}$
14) .06 $\frac{6}{100}$
15) .25 $\frac{25}{100}$
16) .185 $\frac{185}{1000}$
17) .0025 $\frac{25}{10000}$
18) .0001 $\frac{1}{10000}$
19) .1001 $\frac{1001}{10000}$
20) .0086 $\frac{86}{10000}$
21) .204 $\frac{204}{10000}$
22) .06686 $\frac{6686}{100000}$
23) .01 $\frac{1}{100}$
24) .040 $\frac{4}{100}$

Write as mixed decimals:

25) $1\frac{1}{10}$ 1.1
26) $15\frac{3}{100}$ 15.03
27) $73\frac{30}{100}$ 73.3
28) $100\frac{5}{100}$ 100.05
29) $9\frac{12}{100}$ 9.12
30) $150\frac{1}{1000}$ 150.001

Write as mixed numbers:

31) 9.6 $9\frac{6}{10}$
32) 6.246 $6\frac{246}{1000}$
33) 8.054 $8\frac{54}{1000}$
34) 14.0635 $14\frac{635}{10000}$
35) 549.0001 $549\frac{1}{10000}$
36) 10.03 $\frac{3}{100}$

Practice Problems:

Add:

1) .5 + .4
.9

2) .78 + .29
1.07

3) .347 + .655
1.002

4) 3.86 + .37 + 21.7
25.93

5) 52 + 3.64 + 5.761
61.401

6) 2.38 + .418 + 5.2 + 7
14.998

Subtract:

7) .9 − .6
.3

8) 1.2 − .7
.5

9) From 4.50 take 1.82
.68

10) Take .98 fro
1.02

Multiply:

11) .3 x .7
.21

12) .72 x .4
.288

13) 2.5 x 1.7
.0425

14) .0076 x .005
.0000 380

15) .045 x .0037
.000 1665

Divide each decimal by 10, then by 100, then by 1000:

16) .35
35, .0035 .00035

17) .375
375, .00375, .000375

18) .10
.010, .001, .0001

19) .003
.0003, .00003, .000003

20) .0037
.00037 .000037 .000003

21) 5.95
.595, .0595, .00595

22) 15
1.5, .15 .015

23) 5000
500, 50, 5

24) .01625
.001625, .0001625, .00001

25) 4.85
.485, .0485, .00485

Divide

26) 3)12.9
4.3

27) 7).35
.05

28) .5)4.25
8.5

29) 15).21
.014

30) .006)7.32
1220

VARIABLES

Write a whole number that is between 1 and 50. Now add 5 to this number. Here are some of the possibilities:

$2 + 5$ $\quad$ $14 + 5$ $\quad$ $37 + 5$ $\quad$ $49 + 5$ $\quad$ $18 + 5$

Generally this can be expressed as:

Some number plus 5

or

? + 5 $\quad$ △ + 5 $\quad$ □ + 5 $\quad$ $x + 5$ $\quad$ # + 5

Can you think of other ways to write the same idea ?

Symbols like, ?, △, □, #, used in this way are called Variables. In mathematics, letters such as, a, b, c, ... l, m, n, ... r, s, t, ... x, y, or z are used as variables.

Variables are symbols (letters) that hold a place for a number.

$x + 5$

what number added to 5

$2y + 10$

2 times what number plus 10

$$\frac{4}{x}$$

four divided by what number

$15 - p$

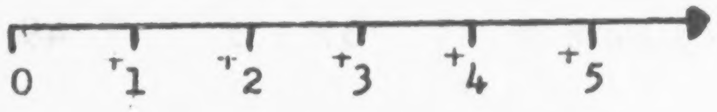
15 minus what number

42-/49

DIRECTED NUMBERS

Directed Numbers = Positive and Negative Numbers.

We are all familiar with positive numbers.

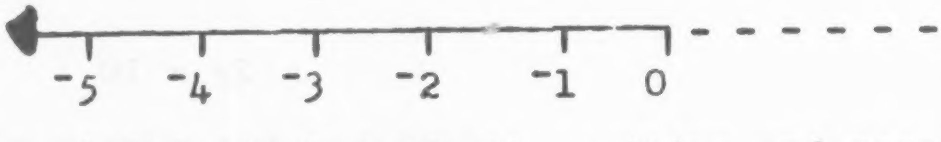


They are the numbers of arithmetic.

We know how to add them, subtract them, multiply them, and divide them. All problems cannot be solved with positive numbers only

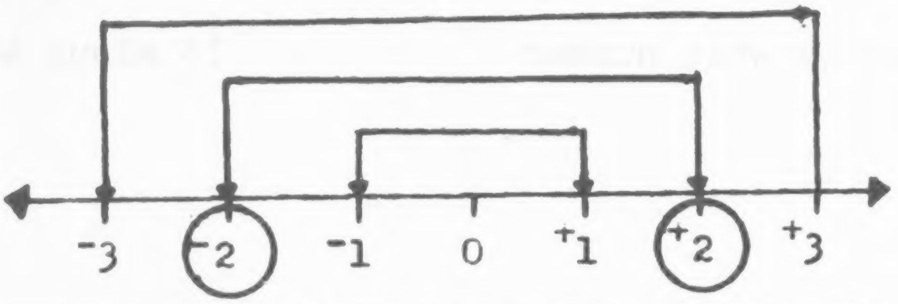
If a gain of \$5 is indicated by plus 5, (+5) How would you indicate a loss of \$5 ? Would this number be a positive number ? No it would not. We need some other kind of numbers other than positive.

By extending the number line to the left of zero, we extend our number system.



to a system that includes both positive and negative numbers.

For every positive number on the number line, there is a corresponding negative number to the left of zero, for example $^{+}2$ and



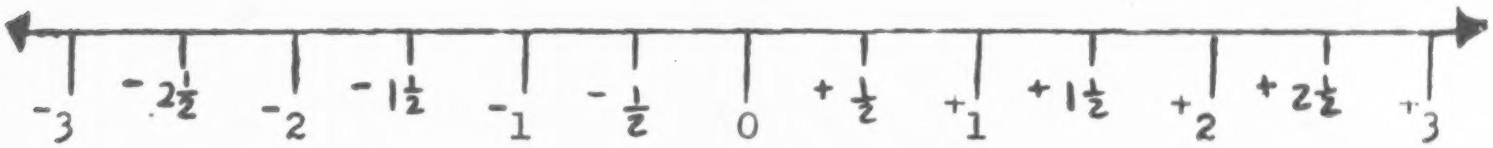
Such pairs of numbers are called opposites. $^{-}2$ is the opposite of $^{+}2$ and $^{+}2$ is the opposite of $^{-}2$.

Numbers on the number line to the right of zero are called "Positive" numbers. They are distinguished by placing a positive (+) sign in front of them, however it should be understood that

2 and $^{+}2$ represent the same number

Numbers to the left of zero are called "Negative" numbers. They are distinguished by placing this (-) sign in front of them. Negative two can be written as $^{-}2$

Positive and Negative Numbers are called Directed Numbers



Directed Numbers

Every number on the number line has an "Opposite" and the sum of a number and its opposite is zero.

$5 + (-5) = 0 \qquad (-5) + 5 = 0$

$$a + (-a) = (-a) + (a) = 0$$

We will call the opposite of a number the Additive Inverse. Do you see why ?

Thus the opposite of a number, and the additive inverse describe the same number.

Number	Additive Inverse or Opposite	Sum
$^{+}2\frac{1}{2}$	$^{-}2\frac{1}{2}$	0
0	0	0
$^{-}1.3$	$^{+}1.3$	0
$^{+}.6$	$^{-}.6$	0
$^{-}4$	$^{+}4$	0

A symbol like the negative sign is used to indicate the opposite of the negative of a number. Not all opposites of numbers are negativ

The opposite of $^{-}6$ is $^{+}6$ or 6

$-(^{-}6) = {}^{+}6$ this is read, "the opposite of negative six is positive six"

A Write in symbols:

1) The opposite of negative twelve. $+12$

2) The opposite of negative nine. $+9$

3) The additive inverse of positive seven. -7

4) The opposite of negative eleven is positive eleven. $-(-11)$ $+11$

5) The opposite of positive forty is negative forty. $-(+40) = -40$

B For each, write the number that when added to the given number, makes the statement true.

$$a + (-a) = 0 \quad \text{or} \quad (-a) + a = 0$$

Example: $^{-}4 + n = 0$

$n = {}^{+}4$

6) $3 + n = 0$ -3

$n =$

7) $.25 + n = 0$

$n =$ $-.25$

8) $^{-}1\frac{2}{3} + c = 0$

$c =$ $1\frac{2}{3}$

9) $^{-}14 + p = 0$ 14

$p =$

10) $5\frac{1}{2} + {}^{-}5\frac{1}{2} = d$

$= d$ 0

11) $-1\frac{1}{2} + t = 0$

$t =$ $1\frac{1}{2}$

12) $100 + n = 0$ -100

$n =$

13) $-\frac{3}{5} + \frac{3}{5} = h$

$= h$ 0

14) $0 + m = 0$

$m =$ 0

15) $^{-}6 + p = 0$

$p =$ 6

16) $-\frac{3}{5} + h = 0$

$h =$ $\frac{3}{5}$

17) $^{-}1 + r = 0$

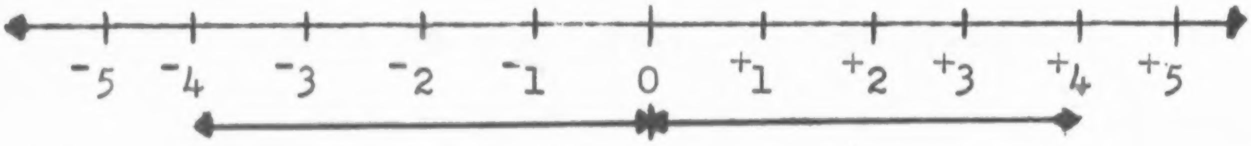
$r =$ $+1$

Absolute Value

The absolute value of a number is the distance the number is from zero on the number line independent of direction. It is always positive. A pair of vertical bars $|\quad|$ is the symbol used to designate absolute value.

$|-4|$ is read "the absolute value of negative four"

$$|^{-}4| = |^{+}4| = 4$$



The distance from 0 to $^{-}4$ is the same as the distance from 0 to $^{+}4$

A Write the opposite of:

1) $^{-}4$ 4
2) $^{+}16$ -16
3) $^{-}1\frac{1}{2}$ $1\frac{1}{2}$
4) $^{+}.3$ $-.3$
5) $^{+}\frac{4}{8}$ $-\frac{4}{8}$
6) $-\frac{9}{16}$ $\frac{9}{16}$
7) $^{+}6\frac{7}{8}$ $-6\frac{7}{8}$
8) $^{-}.72$ $.72$
9) $^{-}72$ 72
10) $^{-}3$ 3
11) $^{+}6$ -6
12) $^{-}12$ 12
13) $^{+}100$ -100
14) $^{-}809$ 809
15) $^{+}2.5$ 2.5
16) $^{-}3.8$ 3.8
17) $1\frac{2}{5}$ $-1\frac{2}{5}$
18) $3\frac{2}{3}$ $-3\frac{2}{3}$

Write the additive inverse:

19) $^{-}15$ 15
20) $^{+}.1$ $-.1$
21) 56 -56
22) $4\frac{1}{3}$ $-4\frac{1}{3}$
23) $^{-}2.3$ 2.3
24) $17\frac{1}{2}$ $-17\frac{1}{2}$
25) 1001 -1001
26) -9 9
27) $^{-}15.430$ 15.4

B. Evalute the following:

28) $|-4|$ (4)

29) $|21|$ (21)

30) $|^{+}7|$ (7)

31) $|0|$ (0)

32) $\left|^{+}1\frac{1}{2}\right|$ ($1\frac{1}{2}$)

33) $|-8.6|$ (8.6)

34) $|^{+}100|$ (100)

35) $|8|$ (8)

36) $-|^{+}8|$ (-8)

37) $-|-7|$ (-7)

38) $-|16|$ (-16)

39) $-\left|-\frac{1}{2}\right|$ ($-\frac{1}{2}$)

C 40) $|5+7|$ (12)

41) $-|-5+3|$ (-2)

42) $-|6-4|$ (-2)

43) $|6-9|$ (3)

44) $-|5-7|$ (-2)

45) $|-4-3|$ (7)

46) $-|-4-6|$ (-10)

47) $|-6+7|$ (1)

48) $-|-4+12|$ (-8)

49) $-|6+4|$ (-10)

50) $-|-6+15|$ (-9)

ADDITION OF DIRECTED NUMBERS

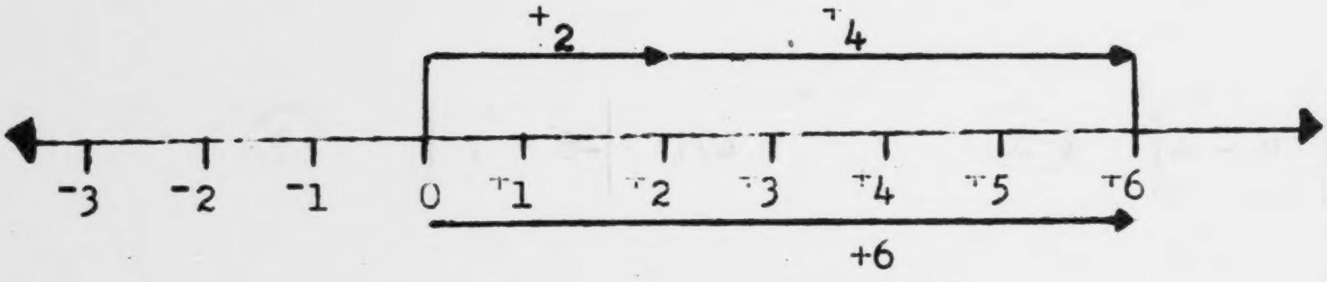
When adding Directed Numbers on the number line, we can use Arrows or Vectors (⟶). A vector has length and direction. The number indicates the length of the vector and the sign of the number indicates the direction of the vector.

+ sign ___ you move to the right on the number line

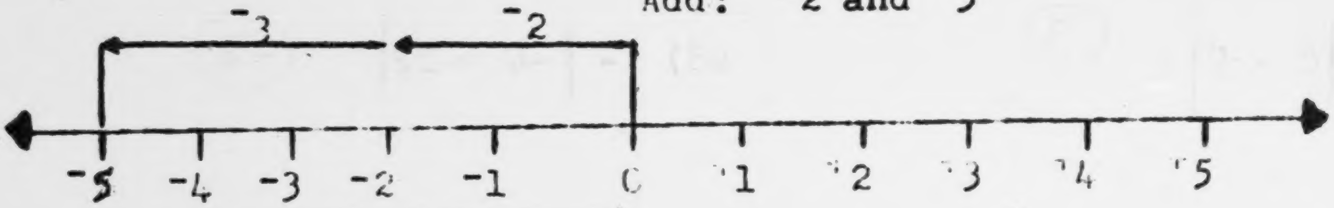
- sign ___ you move to the left on the number line

To add on the number line, draw a vector for the first addend starting at the zero point going in the direction of the sign. Then draw the second vector, starting from the end of the first vector, going in the direction of the sign. The sum is the new vector from zero to the new end point.

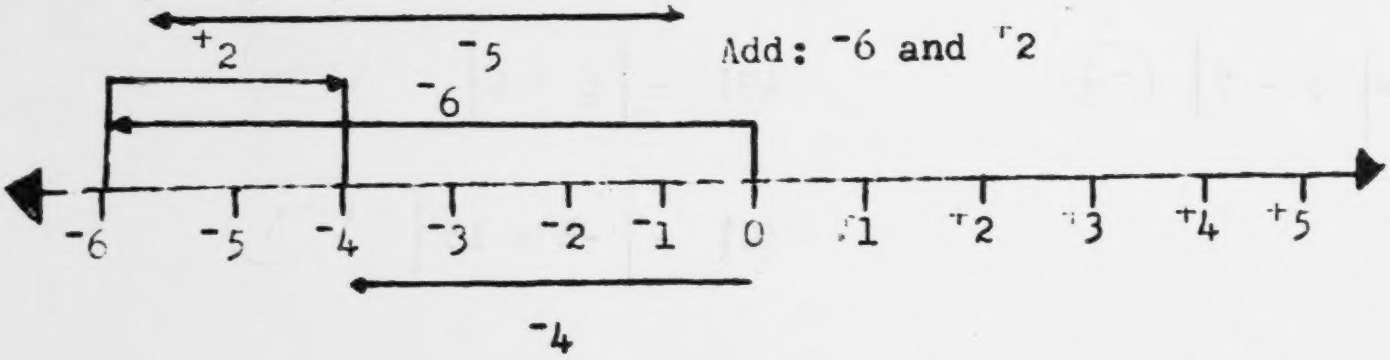
Ex: Add $^{+}2$ and $^{+}4$



Add: $^{-}2$ and $^{-}3$

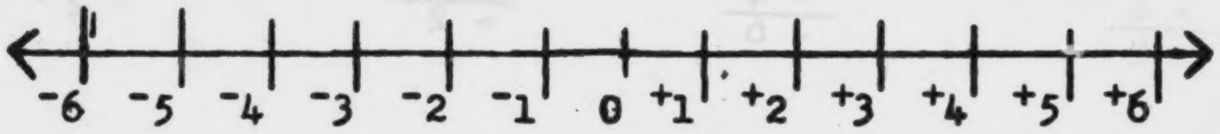


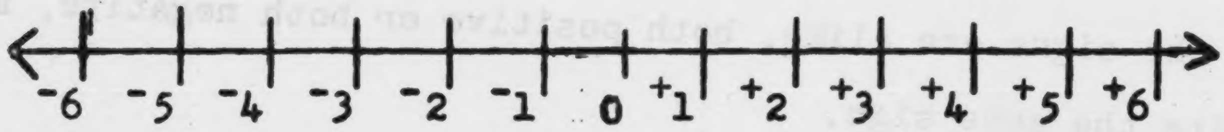
Add: $^{-}6$ and $^{+}2$

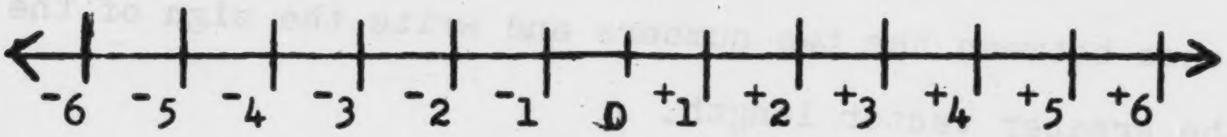


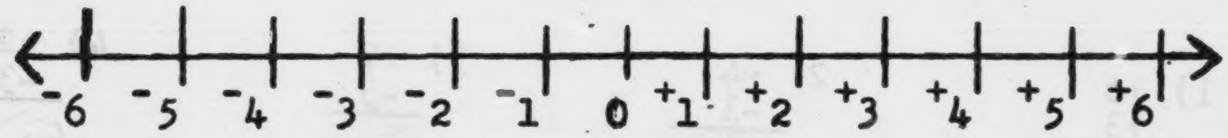
Number Line

Vector Operations


-6
-5
-4
-3
-2
-1
0
+1
+2
+3
+4
+5
+6


-6
-5
-4
-3
-2
-1
0
+1
+2
+3
+4
+5
+6


-6
-5
-4
-3
-2
-1
0
+1
+2
+3
+4
+5
+6


-6
-5
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-3
-2
-1
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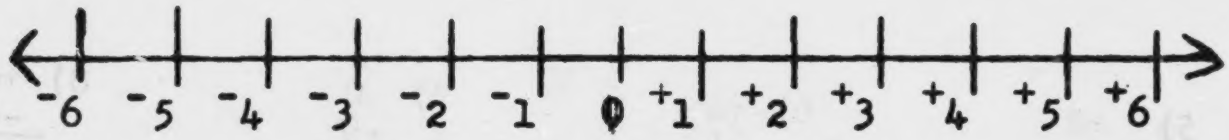
+1
+2
+3
+4
+5
+6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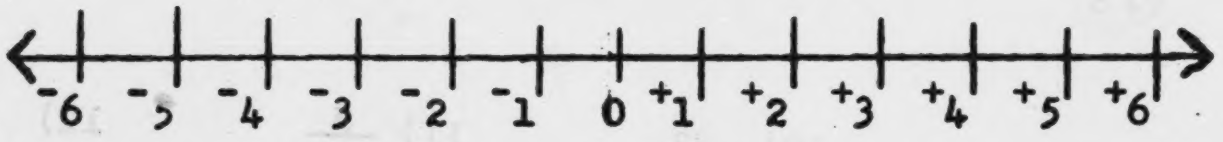
0
+1
+2
+3
+4
+5
+6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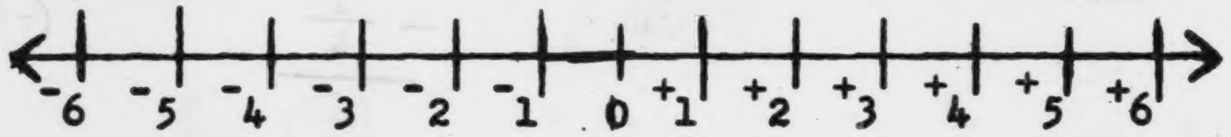
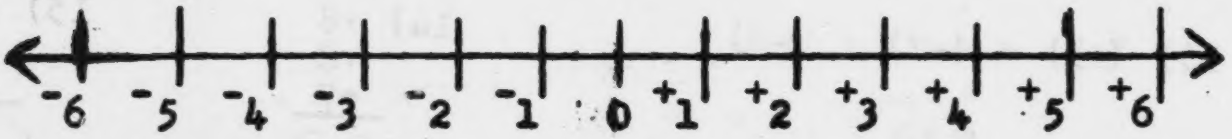
-3
-2
-1
0
+1
+2
+3
+4
+5
+6


-6
-5
-4
-3
-2
-1
0
+1
+2
+3
+4
+5
+6


-6
-5
-4
-3
-2
-1
0
+1
+2
+3
+4
+5
+6

Add:

+ 2
+ 4
+ 6

- 2
- 4
- 6

+ 2
- 4
- 2

- 2
+ 4
+ 2

To Add Directed Numbers

If the signs are alike, both positive or both negative, simply add and write the same sign.

If the signs are unlike, a positive and a negative, find the difference between the two numbers and write the sign of the number with the greater vector length.

A

Add:

1) +5
+3
8

2) -4
-1
-5

3) +7
-3
4

4) +2
-3
-1

5) +8
+15
23

6) +4
-4
0

7) 0
-9
-9

8) +6
-6
0

9) 0
+1
1

10) -83
-49
-132

11) $\frac{3}{4}$
$-\frac{1}{4}$
$\frac{1}{2}$

12) -9
-14
-23

13) (+3) + (-7) + (-8)
-12

14) +8
+8
+7
23

15) -3
-8
-9
-20

B. 22) $(+8) + (-15)$ -7 25) $4 - 8$ -4 28) $9 - 7 + 2$ 4

23) $(-1) + (+11)$ 10 26) $-6 + 7$ 1 29) $5 - 6 - 8$ -9

24) $-5 - 3$ -8 27) $-5 - 3$ -8 30) $-2 - 3 + 9 - 1 + 3$ 6

C. 31) $\frac{1}{2} + 2\frac{1}{2} + (-3\frac{1}{2}) + 4\frac{1}{2} + 2\frac{1}{3} + (-3\frac{1}{3}) + \frac{2}{3} + (-\frac{1}{3})$

$3\frac{1}{3}$

32) $\frac{1}{3} + (-\frac{2}{3}) + \frac{4}{5} + (-5) + 2.5 + (-.5) + 3.5 + 2.4 - 2.9$

$\frac{7}{15}$

33) $2.5 + (-3.5) + 4 + (-5) + 2.5 + (-.5) + 3.5 + 2.4 - 2.9$

3

34) $.5 + (-10.1) + .4 + (-1.2) + (-3) + (-.7) + (-1.4) + 5$

-10.5

Subtracting Signed Numbers

If you buy something that cost 65 cents and give the clerk a dollar, he may count your change saying "65, 75 (handing you a dime), one dollar (handing you a quarter".) He added a dime (10¢), and then a quarter (25¢). If you add 65 + 35 you get 100. The clerk did a subtracting problem (100 - 65) by adding.

Algebraically

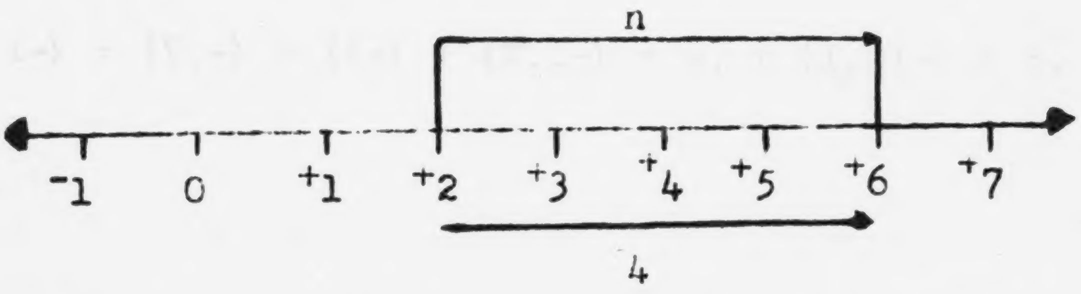
$$100 - 65 = n \quad \text{or} \quad 65 + n = 100$$

$65 + n = 100$ means what number added to 65 equals 100 ?

Subtraction on the Number Line

Subtract $^{+}2$ from $^{+}6$

$$^{+}6 - {}^{+}2 \text{ or } {}^{+}2 + n = {}^{+}6$$



You Think:

What number added to $^{+}2$ equals $^{+}6$?

$$2 + (6-2) = 6$$

$$2 + 4 = 6$$

On the Number Line:

In what direction and how many units do you move to get from the subtrahend to the minuent ?

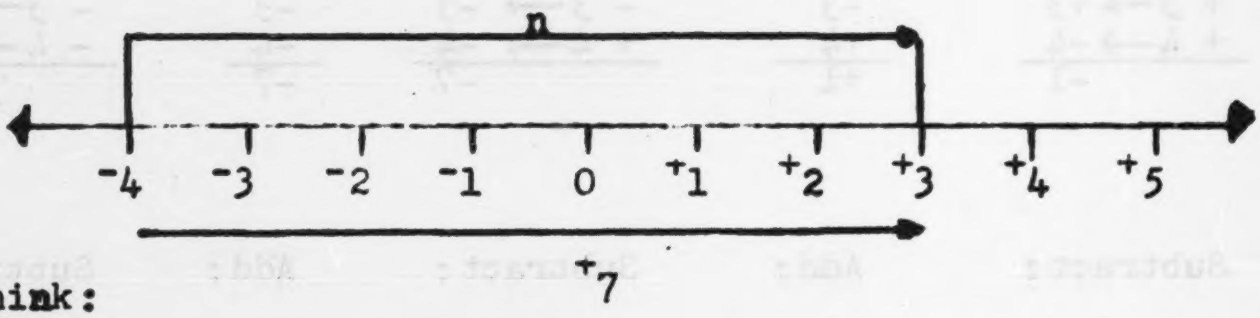
Answer: Positive direction and 4 units to the right = $^{+}4$

Subtract:

$(+3) - (-4)$ is thought of as

Negative four plus what number is equal to positive 3 ?

$$-4 + n = +3$$



You Think:

What number added to $^{-}4$ equals $^{+}3$?

$$^{-}4 + (3 - (^{-}4)) = 3$$

$$^{-}4 + 7 = {}^{+}3$$

On The Number Line:

In what direction and how many units do you move to get from the subtrahend to the minuend ?

Answer: Positive direction and 7 units to the right = $^{+}7$

The distance from $^{-}4$ to $^{+}3$ is 7 units. The direction is to the right or positive. Therefore:

$$^{+}3 - (^{-}4) = {}^{+}7$$

Check:

$$^{+}3 - (^{-}4) = {}^{+}7$$

because: $^{-}4 + (^{+}7) = 3$

For any directed numbers a, and b

$$a - b = a + (-b)$$

Replace the subtrahend by its opposite and add

Add: $\begin{array}{r} +3 \\ +4 \\ \hline +7 \end{array}$ **Subtract:** $\begin{array}{rcr} +3 & \longrightarrow & +3 \\ +4 & \longrightarrow & -4 \\ \hline & & -1 \end{array}$ **Add:** $\begin{array}{r} -3 \\ +4 \\ \hline +1 \end{array}$ **Subtract:** $\begin{array}{rcr} -3 & \longrightarrow & -3 \\ +4 & \longrightarrow & -4 \\ \hline & & -7 \end{array}$ **Add:** $\begin{array}{r} -3 \\ -4 \\ \hline -7 \end{array}$ **Subtract:** $\begin{array}{rcr} -3 & \longrightarrow & -3 \\ -4 & \longrightarrow & +4 \\ \hline & & +1 \end{array}$

Add: $\begin{array}{r} +3 \\ -4 \\ \hline -1 \end{array}$ **Subtract:** $\begin{array}{rcr} +3 & \longrightarrow & +3 \\ -4 & \longrightarrow & +4 \\ \hline & & +7 \end{array}$ **Add:** $\begin{array}{r} 0 \\ +4 \\ \hline +4 \end{array}$ **Subtract:** $\begin{array}{rcr} 0 & \longrightarrow & 0 \\ +4 & \longrightarrow & -4 \\ \hline & & -4 \end{array}$ **Add:** $\begin{array}{r} 0 \\ -4 \\ \hline -4 \end{array}$ **Subtract:** $\begin{array}{rcr} 0 & \longrightarrow & 0 \\ -4 & \longrightarrow & +4 \\ \hline & & +4 \end{array}$

A. Subtract on the number line using vectors:

1) $\begin{array}{r} +6 \\ +3 \\ \hline \boxed{3} \end{array}$ 2) $\begin{array}{r} +2 \\ +9 \\ \hline \boxed{-7} \end{array}$ 3) $\begin{array}{r} -5 \\ -1 \\ \hline \boxed{-4} \end{array}$ 4) $\begin{array}{r} -3 \\ -7 \\ \hline \boxed{+4} \end{array}$ 5) $\begin{array}{r} -4 \\ -4 \\ \hline \boxed{0} \end{array}$ 6) $\begin{array}{r} 0 \\ -8 \\ \hline \boxed{8} \end{array}$ 7) $\begin{array}{r} -2 \\ +5 \\ \hline \boxed{-7} \end{array}$ 8) $\begin{array}{r} +4 \\ -6 \\ \hline \boxed{10} \end{array}$

Subtract:

9) $\begin{array}{r} 9 \\ 3 \\ \hline \boxed{6} \end{array}$ 10) $\begin{array}{r} +11 \\ 6 \\ \hline \boxed{5} \end{array}$ 11) $\begin{array}{r} +15 \\ +9 \\ \hline \boxed{6} \end{array}$ 12) $\begin{array}{r} -6 \\ -4 \\ \hline \boxed{-2} \end{array}$ 13) $\begin{array}{r} -10 \\ -5 \\ \hline \boxed{-5} \end{array}$ 14) $\begin{array}{r} +17 \\ +8 \\ \hline \boxed{9} \end{array}$ 15) $\begin{array}{r} -12 \\ -7 \\ \hline \boxed{-5} \end{array}$

16) $\begin{array}{r} +7 \\ -7 \\ \hline \boxed{14} \end{array}$ 17) $\begin{array}{r} 5 \\ 7 \\ \hline \boxed{-2} \end{array}$ 18) $\begin{array}{r} -5 \\ -8 \\ \hline \boxed{3} \end{array}$ 19) $\begin{array}{r} +9 \\ -11 \\ \hline \boxed{20} \end{array}$ 20) $\begin{array}{r} +6 \\ -5 \\ \hline \boxed{11} \end{array}$ 21) $\begin{array}{r} 6 \\ 15 \\ \hline \boxed{-9} \end{array}$ 22) $\begin{array}{r} -5 \\ +1 \\ \hline \boxed{-6} \end{array}$ 23) $\begin{array}{r} -16 \\ +25 \\ \hline \boxed{-41} \end{array}$

24) $\begin{array}{r} +5 \\ +9 \\ \hline \boxed{-4} \end{array}$ 25) $\begin{array}{r} -6 \\ -2 \\ \hline \boxed{-4} \end{array}$ 26) $\begin{array}{r} -13 \\ +7 \\ \hline \boxed{-20} \end{array}$ 27) $\begin{array}{r} +70 \\ -15 \\ \hline \boxed{85} \end{array}$ 28) $\begin{array}{r} -3 \\ 0 \\ \hline \boxed{-3} \end{array}$ 29) $\begin{array}{r} -14 \\ +14 \\ \hline \boxed{-28} \end{array}$ 30) $\begin{array}{r} 0 \\ -17 \\ \hline \boxed{17} \end{array}$

Subtract the lower number from the upper number:

B. 31) $\begin{array}{r} +\frac{1}{2} \\ +\frac{1}{4} \\ \hline \frac{1}{4} \end{array}$ 32) $\begin{array}{r} +\frac{2}{8} \\ +\frac{3}{8} \\ \hline -\frac{1}{8} \end{array}$ 33) $\begin{array}{r} -\frac{7}{5} \\ -\frac{4}{5} \\ \hline -\frac{3}{5} \end{array}$ 34) $\begin{array}{r} -\frac{5}{50} \\ -\frac{4}{50} \\ \hline -\frac{1}{50} \end{array}$

35) $\begin{array}{r} +\frac{10}{10} \\ -\frac{2}{10} \\ \hline 1\frac{1}{5} \end{array}$ 36) $\begin{array}{r} -\frac{6}{10} \\ +\frac{6}{10} \\ \hline -1\frac{1}{5} \end{array}$ 37) $\begin{array}{r} +\frac{3}{4} \\ +\frac{1}{5} \\ \hline \frac{11}{20} \end{array}$ 38) $\begin{array}{r} -\frac{5}{12} \\ -\frac{7}{8} \\ \hline \frac{11}{24} \end{array}$

39) $\begin{array}{r} +\frac{3}{8} \\ -\frac{1}{6} \\ \hline \frac{13}{24} \end{array}$ 40) $\begin{array}{r} -\frac{5}{12} \\ +\frac{1}{4} \\ \hline -\frac{2}{3} \end{array}$ 41) $\begin{array}{r} -19\frac{1}{6} \\ -7\frac{1}{4} \\ \hline -11\frac{11}{12} \end{array}$ 42) $\begin{array}{r} \frac{4}{7} \\ -\frac{1}{64} \\ \hline \frac{37}{64} \end{array}$ 43) $\begin{array}{r} -13\frac{1}{3} \\ +26\frac{1}{3} \\ \hline -39\frac{2}{3} \end{array}$

C. Subtract as indicated:

44) 27 - 5 22

45) (-6) - (+7) -13

46) (2) - (-2) 4

47) (8 + 7) - (6 - 13) 22

48) (4 - 3) - (6 - 10) 5

49) (2 - 6) - (7 - 8) -3

50) From - 5 subtract 10 -15

51) Take 4 from 1 -3

52) From - 3 take - 7 -10

Simplify by finding the absolute value and performing the indicated operation.

53) $|-4| - |-9|$ -5

54) $|6 - 2| - |-5|$ -1

55) $|1 - 3| - |4 - 7|$ -1

56) $|-3 -8| -6$ 5

57) $8 - |5 + 9|$ -6

58) $|(0 - 2) - (4 - 2)|$ 4

59) $|6 - 3| - |4 + 2|$ -3

60) $|(2 - 3)| + |(6 + 4)|$ 9

61) $-|6 - 3| + |10 + 5|$ 12

62) $|6 + 4| - |6 - 2|$ 6

63) $-|10 - 12| + |6 + 3|$ 7

64) $|5 + 6| - |-6 + 3|$ 8

65) $|4 + 2| + |-4 - 2|$ 12

MULTIPLICATION OF SIGNED NUMBERS

In Algebra, multiplication is indicated differently than in arithmetic.

In arithmetic the x symbol is used to indicate multiplication.

Ex. The product of 3 and 4 would be

$$3 \times 4$$

In Algebra, the x symbol is very seldom used, instead we use:

a raised dot $3 \cdot 4$

or parentheses $3(4) = (3)(4)$

When multiplying a number by a variable (letter) or a variable by a variable, the raised dot or parentheses are omitted.

Ex: 3 times y = 3y

r times s = rs

Multiplication can be thought of as Repeated Addition.

Consider:

$$(+3)(+4) = (+4)+(+4)+(+4) = {}^{+}12$$

The product of two positive numbers is positive.

Similarly,

$$(+3)(-4) = (-4)+(-4)+(-4) = {}^{-}12$$

The product of a positive number and a negative number is negative

What do you think the product of (-3)(-4) is ?

(Two negative numbers)

Since -3 means the opposite of +3

-3(-4) means to take the opposite of +3(-4), or $-[{}^{+}3({}^{-}4)]$

We know that

+3(-4) = -12

and that the opposite of -12 is +12

i.e. -(-12) = +12

therefore

(-3)(-4) = +12

The product of a negative number and a negative number is a positive

A Find each indicated product:

1) +5	2) +6	3) +7	4) -2	5) -9	6) -6
+9	+8	+7	-3	-4	-7
45	48	49	6	36	42
7) -8	8) -7	9) -5	10) 0	11) +6	12) +12
-5	+8	0	-8	-6	-8
40	-56	0	0	-36	-96
13) +4	14) -.4	15) +2.5	16) $-3\frac{1}{2}$	17) -12	
-5	-.2	-1.4	$+2\frac{1}{4}$	$-1\frac{2}{3}$	
-20	.08	-3.5	$-7\frac{1}{8}$	20	

18) (-3) (-7) 21

19) (-1) (1) (-1) 1

20) $\frac{1}{2}$ (-2) -1

21) (-3) $(-\frac{1}{3})$ 1

B. 22) $(-3)(-9)$ 27

23) $(+4)(-7)$ -28

24) $11(3-14)$ -121

25) $-8(-7-5)$ 96

26) $(+6 \times -2)(-4)$ 48

27) $(\frac{1}{2})(\frac{-1}{4})(\frac{-2}{5})$ $\frac{1}{20}$

28) $(-6)(-3)(-2 \times -5)$ 180

29) $(-2)(+3)(-1)(-4)$ -24

30) $-5(3-8)-(1-4)$ 28

C. Simplify by performing the indicated operation, and then find the absolute value.

31) $|(-1)(-5)|$ 5

32) $-10|-6|$ -60

33) $|-4||-7|$ 28

34) $|12-3|\ |6-8|$ 18

35) $(-6)|(-2)(-9)(-1)|$ -108

36) $|-5||(-4)(-11)(-1)|$ 220

37) $|(5)\ (-7)|$ 35

38) $-6|15|$ -90

39) $15|-10|$ 150

40) $-5\ |(-3)\ (-9)\ (-7)|$ 945

41) $|(-4)(7)|\ |(-3)\ (-2)|$ 168

42) $|12 - 2|\ |13 + 3|$ 160

DIVISION OF SIGNED NUMBERS

As in arithmetic, division in algebra may be indicated in several ways:

Ex: t divided by 3

a) $t \div 3$

b) $\frac{1}{3} t$

c) $\frac{t}{3}$

The first method is $(t \div 3)$ is very seldom used in algebra.

Division is often thought of as the "Inverse" operation of multiplication.

$\frac{+15}{+3} = +5$ because $(+3)(+5) = +15$

$\frac{-15}{-3} = +5$ because $(-3)(+5) = -15$

If the signs are alike, both positive or both negative (dividend and divisor) the quotient is positive

$\frac{+15}{-3} = -5$ because $(-3 \times -5) = +15$

$\frac{-15}{+3} = -5$ because $(+3)(-5) = -15$

If the signs are unlike, one positive and one negative (dividend and divisor) the quotient is negative

B. 22) $(-3)(-9)$ 27 25) $-8(-7-5)$ 96 28) $(-6)(-3)(-2 \times -5)$ 180

23) $(+4)(-7)$ -28 26) $(+6 \times -2)(-4)$ 48 29) $(-2)(+3)(-1)(-4)$ -24

24) $11(3-14)$ -121 27) $(-\frac{1}{2})(\frac{-1}{4})(\frac{-2}{5})$ $\frac{1}{20}$ 30) $-5(3-8)-(1-4)$ 28

C. Simplify by performing the indicated operation, and then find the absolute value.

31) $|(-1)(-5)|$ 5 34) $|12-3|\,|6-8|$ 18

32) $-10|-6|$ -60 35) $(-6)|(-2)(-9)(-1)|$ -108

33) $|-4||-7|$ 28 36) $|-5||(-4)(-11)(-1)|$ 220

37) $|(5)\ (-7)|$ 35 40) $-5\ |(-3)\ (-9)\ (-7)|$ 945

38) $-6\,|15|$ -90 41) $|(-4)(7)|\ |(-3)\ (-2)|$ 168

39) $15\,|-10|$ 150 42) $|12-2|\,|13+3|$ 160

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$$\frac{+15}{-3} = -5 \text{ because } (-3 \times -5) = +15$$

$$\frac{-15}{+3} = -5 \text{ because } (+3)(-5) = -15$$

If the signs are unlike, one positive and one negative (dividend and divisor) the quotient is negative

Find the indicated quotients

A. 1) $\frac{+30}{+5}$ 6 2) $\frac{+16}{+4}$ 4 3) $\frac{+54}{+9}$ 6 4) $\frac{+56}{-7}$ -8 5) $\frac{+18}{-3}$ -6 6) $\frac{+45}{-5}$ -9

7) $\frac{-9}{-9}$ 1 8) $\frac{+7}{-7}$ -1 9) $\frac{-15}{-1}$ 15 10) $\frac{+60}{+10}$ 6 11) $\frac{+36}{-6}$ -6 12) $\frac{-40}{+1}$ -40

13) $\frac{-8}{-2}$ 4 14) $\frac{-15}{-5}$ 3 15) $\frac{0}{+6}$ 0 16) $\frac{-63}{+7}$ -9 17) $\frac{0}{-3}$ 0 18) $\frac{-90}{-18}$ 5

19) $\frac{-80}{+10}$ -8 20) $\frac{0}{+15}$ 0 21) $\frac{-72}{-2}$ 36 22) $\frac{-144}{+16}$ -9 23) $\frac{0}{-20}$ 0 24) $-\frac{3}{7} \div 3$ $-\frac{1}{7}$

B. 25) $36 \div (-\frac{1}{2})$ -72 26) $\frac{-15.6}{12}$ -1.3 27) $\frac{1.82}{-13}$ -.14 28) $16 \div (-\frac{1}{4})$ -64

29) $+2\overline{)-14}$ -7 30) $-8\overline{)-64}$ 8 31) $-3\overline{)+27}$ 9 32) $-5\overline{)+50}$ -10

33) $.4\overline{)-3.2}$ -.8 34) $-7\overline{)+21}$ -3

Simplify:

35) $\frac{8-17}{3}$ -3 36) $\frac{-10-4}{-7}$ 2 37) $\frac{12-3(4)}{-2}$ 0 38) $\frac{8(-1)+7(-6)}{-5(5)}$ 2

39) $\frac{6(4-7)-5(6-12)}{-3(1-5)}$ 1

C. Simplify by performing the indicated operation.

Ex: $\frac{|-16|}{8} = \frac{+16}{8} = +2$

40) $\left|\frac{-30}{-5}\right|$ ⑥

41) $\frac{|-24|}{|-2|}$ ⑫

42) $\frac{|-8|\;|-6|}{|-9| - |-5|}$ ⑫

43) $\frac{|(-12)\,(+7)|}{|8-9| - |1-5|}$ $\boxed{-28}$

44) $\frac{|-3| - |1|}{|(-6)+(-7)|}$ $\boxed{\frac{2}{13}}$

45) $\frac{|-2| + |6|}{|7+5|}$ $\boxed{\frac{2}{3}}$

46) $\frac{-|30|}{|-5|}$ $\boxed{-6}$

47) $\frac{|-3| - |5|}{-|5-7|}$ ①

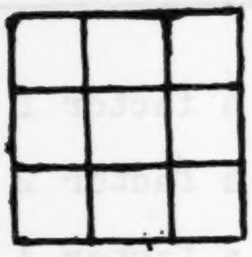
48) $\frac{|(-17)\,(+6)|}{|7+4| - |1-4|}$ $\boxed{12\frac{3}{4}}$

49) $\frac{|-14|}{|-7|}$ ②

50) $\frac{|14+6| - |7|}{|-1+14|}$ ①

Exponents

You are familiar with the formula for finding the area of a square.



$A = s^2$ (in this formula s represents the length of the side)

Evaluate

$A = s^2$

$A = 3^2$

$A = 3 \cdot 3$

$A = 9$ square units

In the expression of the form

b^n

the number b is called the "Base" and

the number n is called the "Exponent"

The Exponent Tells You How Many Times To Use The Base as a Factor

$3^1 = 3$ = (3 is a factor 1 time) = 3

$3^2 = 3 \cdot 3$ = (3 is a factor 2 times) = 9

$3^3 = 3 \cdot 3 \cdot 3$ = (3 is a factor 3 times) = 27

$3^4 = 3 \cdot 3 \cdot 3 \cdot 3$ = (3 is a factor 4 times) = 81

3^2 is read "3 squared.

3^3 is read "3 cubed.

3^4 is read "3 to the fourth.

3^5 is read "3 to the fifth.

Rewrite each of the following expressions in shorter form.

Ex. $b \cdot b = b^2$

A. 1) $c \cdot c \cdot c$ c^3

2) a cubed a^3

3) d squared d^2

4) $7\, n \cdot n \cdot n$ $7n^3$

5) $14\, m \cdot m \cdot m$ $14m^3$

6) $n \cdot n \cdot n$ n^3

7) $8\, n \cdot n \cdot n$ $8n^3$

8) E fourth E^4

9) F cubed F^3

10) R used as a factor 5 times R^5

11) s used as a factor 6 times s^6

12) Five times the cube of y $5y^3$

13) Eight times the square of p $8p^2$

14) $6 \cdot 6 \cdot 6 \cdot 6$ 6^4

15) One-fourth cubed $\frac{1}{4}^3$

16) The square of 3 t $(3c)^2$

17) The square of 8 i $(8i)^2$

18) The cube of x y $(xy)^3$

19) The cube of r s $(rs)^3$

20) The cube of (a-2) $(a-2)^3$

21) The cube of (2-a) $(2-a)^3$

22) The cube of the sum r plus 3 $(r+3)^3$

B. Evaluate:

23) 2^2 4

24) 3^4 81

25) 2^7 128

26) 6^4 1296

27) -3^2 9

28) -2^5 -32

29) 5^2 25

30) $(\frac{1}{2})^3$ $\frac{1}{8}$

31) $(\frac{1}{3})^4$ $\frac{1}{81}$

32) $(\frac{2}{3})^3$ $\frac{8}{27}$

33) $(-\frac{1}{8})^3$ $-\frac{1}{512}$

34) $(-\frac{3}{4})^2$ $\frac{9}{16}$

35) 1^{75} 1

36) 0^5 0

37) $.3^2$ .09

38) $.03^2$ .0009

39) $-.1^3$ -.001

40) $-.1^4$ .0001

41) 1.2^2 1.44

42) 1.4^1 1.4

43) 0^1 0

44) $.4^4$ .0246

45) $-.3^2$ .09

46) $-.04^3$ -.000064

47) If $m = 3$, then $m^2 =$ 9.

48) If $n = 4$, then $n^3 =$ 64.

59) If $p = 3$, then $4p^2 =$ 36.

50) If $x = \frac{1}{3}$, then $(9x)^3 =$ 27

51) If $y = \frac{1}{4}$, then $(8y)^3 =$ 8

52) If $t = -\frac{3}{4}$, then $(2t)^2 =$ 6

Punctuation Marks in Algebra

What is the answer to the following statement ?

3 x 3 + 3

Is it 12 or is it 18 ?

In order to decide we must punctuate the statement.

If we write it as:

(3x3) + 3 the answer is 12

If we write it as:

3 x (3+3) the answer is 18

A pair of parentheses is called a symbol of inclusion, because it is used to enclose or group two or more symbols (numbers and or letters) to represent one number.

Look at 3 (2+4) are parentheses tell you to add before you multiply.

There are other symbols of inclusion:

Parentheses	Brackets	Braces	Bar
3 (2+4)	3 [2+4]	3{2+3}	$3\ \overline{2+4}$

When you see a group inside of another group such as:

2[4 + (7 - 2)] you simplify from the inside out

$$\begin{aligned} 2[4 + (7 - 2)] &= 2[4 + 5] \\ &= 2[9] \\ &= 18 \end{aligned}$$

A Copy and simplify:

Ex: $\frac{4}{-2} + (7+3) = -2 + 10$

$= 8$

1) $-4 + (2 \times 3)$ [illegible]

2) $(7-3) + 5$ 9

3) $(5+3)(-1)$ -8

4) $8 + (3-5)$ 6

5) $\frac{15 \div 4}{6 \div 4}$ $-1\frac{9}{10}$

6) $\frac{10 + 1}{1 - 2}$ -11

7) $3 \cdot 2 \div (4-2)$ 3

8) $\frac{\frac{20}{-5}}{5}$ $\frac{-4}{5}$

9) $\frac{64}{\frac{8}{2}}$ 16

10) $\frac{7}{\frac{21}{-3}}$ -1

11) $\frac{17 + 1}{8 - 2}$ 3

12) $2\{6 \div 5 + 2\}$ 26

13) $5[2 + 1 - 2] - 6$ -1

14) $\frac{4}{-2} \div (7+3) - 15$ -7

15) $\frac{6\ (2)}{12 - 4}$ $1\frac{1}{2}$

16) $\frac{\quad}{5 - 2} \div \frac{\quad}{5 \div 2}$ 10

17) $\frac{13 - 10}{5 \cdot 2}$ $\frac{3}{10}$

18) $\frac{15 - 5}{2\ (-10)}$ $-\frac{1}{2}$

B 19) $[\{(\frac{100 - 36}{1 + 7} - 8) \times 3\} + 5] \times 200$ 1000

20) $[(\frac{50 \div 5}{15}) \div 5] \div 1$ 2

21) $[\{(\frac{579 + 682}{39}) \times 27\} \div \frac{\quad}{9 \times 3}$ 900

22) $[2\{(\frac{52 - 100}{-3}) + 80\} + 16] \times 1$ 208

23) $[3\{(4)(2) + (6)(10)\} + 56] - 8 \div 2$ 256

Order of Operations

Parentheses and other symbols of inclusion are used to make the meaning of numerical expressions clear. However, there are standard rules you may use when punctuation marks are omitted in a numerical expression. The rules give the order to follow when performing the operations indicated in the expression.

Consider:

$2 + 4 + 5$ means $(2 + 4) + 5 = 6 + 5 = 11$

$8 - 3 - 2$ means $(8 - 3) - 2 = 5 - 2 = 3$

$2 + 3 \times 4$ means $2 + (3 \times 4) = 2 + 12 = 14$

$24 \div 6 - 1$ means $(24 \div 6 - 1 = 4 - 1 = 3$

$12 \times 4 - 7 \times 2$ means $(12 \times 4) - (7 \times 2) = 48 - 14 = 34$

$35 \div 5 \times 2$ means $(35 \div 5) \times 2 = 7 \times 2 = 14$

$3 \times 5 \times 2$ means $(3 \times 5) \times 2 = 15 \times 2 = 30$

$3 + 2\ (5 - 2)$ means $3 + 2\ (3) = 3 + 6 = 90$

When a numerical expression contains a series of numerals joined by symbols of operation, we:

a) Remove symbols of inclusion working from the inner most symbol out;

b) Raise to a power;

c) Do the multiplication and division in order from left to right

d) Finally, do the addition & subtraction in order from left to right

A. Copy and simplify:

1) 12 - 0 - 1 11

2) 5 - 3 - 2 0

3) 4(3) + 7 19

4) $7 + 7 \times \frac{1}{3}$ $9\frac{1}{3}$

5) 20 ÷ 5 ÷ 2 2

6) 12 ÷ 6 x 4 8

7) 10 + 9 + 3 22

8) 48 + 5 x 0 48

9) 21 ÷ 1 x 7 147

10) 21 ÷ 7 x 1 3

11) 80 ÷ 8 - 80 ÷ 10 2

12) 12 (4) - 16 ÷ 2 40

13) 7 x 5 x 4 140

14) $\frac{1}{5} \times 12\frac{1}{2} \times 2$ 5

B.15) 6 x 2 -2 ÷ 2 11

16) 7 ÷ 7 + 2 x 7 15

17) 16 - 2(4) + 5 13

18) 5 - 2 + 4 x 3 15

19) 12 x 6 + 12 x 4 120

20) 33 x 3 + 33 x 1 132

21) 21 + 5 (7+3) - 20 51

22) 7 + 3 (5-1) ÷ 6 9

23) 7 + (15-3) ÷ 6 9

24) 8 ÷ 2 + 6 ÷ 3 6

C.25) $\frac{5\ (3) + 20}{5 + 2}$ 5

26) $\frac{2 \times 3 + 21}{2 + 1}$ 9

27) 27 + 10 - (11+3) 23

28) -7 x 2 + 3 - 15 -26

29) $7(-2) + 4 - \frac{14}{2}$ -17

30) $3^2 + 4 \cdot 2 - 7$ 10

31) 30 - 3 (7-2) 15

32) $\frac{4\ (3+1) - 1}{4 + 1}$ 3

33) 2 + 4 - 5 x 1 ÷ 3 $4\frac{1}{3}$

34) $4^2 - 3^3 + 2 \cdot 4$ -3

35) $16 \div (-2) + 2^3 - 7 \cdot 2$ -14

36) $4^2 + 1^{16} - 15 + \frac{2.3}{3}$ 4

Copy and simplify each of the following expressions:

Ex: 10 + 2(3+7) - 4 (1-5)

10 + 2(10) - 4(-4)

10 + 20 - 16

30 - 16

14

A 1) (7+302) ÷ 3 + 1 104

2) (7+3+2) ÷ 3 + 1 5

3) 5(7-9) ÷ 4 + 3 5

4) 21 + 5(7+3) - 20 51

5) 6(7+2) - 15 ÷ 5 51

6) $\frac{9 - 5(3-2)}{3 + 5}$ $\frac{1}{2}$

7) 3(9) + 3(-6) + 5(5-1) -2 27

8) 6(6+8) + 8 - 32 ÷ 16 90

9) (12-2)(18-3) 150

10) (2 x 3 - 12 ÷ 3) ÷ 2 1

11) (15 - 3 + 8 + 2) ÷ 8 x 5 $11\frac{1}{4}$

12) 5 + 4 - (3-1) 7

B. 13) $\frac{1}{2}$ [8 ÷ 2(-4) ÷ (8 x 4 ÷2)] $\frac{1}{32}$

14) $\frac{4 \text{ x } 5 \text{ x } 20 - 6 \div 2}{13 + 3 \text{ x } 1 \text{ x } 5}$ $14\frac{5}{28}$

15)
15) $\frac{\frac{2}{3} - \frac{4}{3}}{7 - 15}$ $\frac{1}{12}$

16) $\frac{1 + 44 \div 4 + 12 \text{ x } 44}{3 \text{ x } 3 - 3 \div 3 + 2}$ 54

17) 3 + 48 - 16 - 35 ÷ 7 30

18) $\frac{3^2 - (\frac{1}{2})^2 (6)}{2}$ $3\frac{3}{4}$

LANGUAGE OF ALGEBRA

Algebra, as all branches of mathematics, has its own language and symbols. Symbols previously used in arithmetic are also used in algebra with some additional ones.

Operational symbols

Addition	Subtraction	Multiplication	Division
+	-	x, ·, ()(), ab	÷, $\frac{a}{b}$

Others

Equality	Inequalities	Inclusion	Square Root
=	<, >	(), [], {}, —	$\sqrt{}$

Absolute Value	Pi
$\mid\ \mid$	π

Words and Phrases

Constant - a variable with just one value

Variable - a symbol used to hold the place of a numeral

Numerical Expression - consist of one or more numerals, with or without operational symbols

Variable Expression - an expression that contains at least one variable

Algebraic Expression - Any variable expression or numerical expression

Term -an algebraic expression written as a product or quotient of numerals or variables or both

Factor - each of the numbers multiplied to find a product

Coefficient - each factor of a product

Evaluating an Algebraic Expression - Performing indicated operation to determine the number an algebraic expression represents

One must be able to translate verbal statements into algebraic statements and vice-versa. Different words in a phrase or sentence tell you which operation and what symbols to use in order to make a translation.

WORDS THAT IMPLY

Addition	Subtraction	Multiplication	Division
(+)	(-)	(·)	(÷)
Plus	Subtract	Multiply	Divide
Sum	Minus	Times	Quotient
Add	Decrease	Product	Ratio
More than	Less than	Twice	What Part Of
Greater than	Difference	Double	Half
Increase	Remainder	Square	Fourth, etc.
	Diminish	Cube	

Algebra and Mind-Reading

Mind-reading stunt 1.

Think of a number less than 10. Add 4 to this number. Multiply what you now have by 2. Subtract 5 from this product and from this difference take away the original number.

If you will tell me the answer you now have, I will tell you the number you chose in the first place.

Mind-reading stunt 2.

Think of *any* number. Multiply the number by 3. Add 2. Subtract the original number. Subtract 2.

You now have a number which is exactly twice the number you started with.

Something to think about: How do I know these mysterious facts ?

Mind-reading stunt 3.

1. Make up your own set of direction.
2. Take a number and follow your own directions.
3. Give me your set of directions and you final answer, and I will tell you your original number.

Stunt 1

$$[2(n + 4) - 5] - n$$

$$2n\ ^{s}8 - 5 - n$$

$$n + 3$$

Stunt 2

$$3(n) + 2 - n - 2$$

$$3n + 2 - n - 2$$

$$2n$$

Look at the following:

The sum of five and seven

$5 + 7$

The difference between x and four

$x - 4$

The area (A) divided by the length (l)

$$\frac{A}{l}$$

The square of the velocity (v)

v^2

Six diminished by 3

$6-3$

Two times p

$2p$

> To write algebraic expressions, write numerals, variables, and operational symbols in proper order as required.

A. Copy and express algebraically:

1) x added to y $x+y$
2) a plus 7 $a+7$
3) Five incredsed by three $5+3$
4) Take 4 from m $m-4$
5) 4 less d $4-d$
6) m minus n $m-n$
7) the sum of d and twelve $d+12$
8) 18 more than t $t+18$
9) 9 times y $9y$
10) Two times Pi times the radius $r(2\pi)$
11) Twice seven $2(7)$
12) One-fifth x $\frac{1}{5}x$
13) The square of the side (s) s^2
14) The square of M M^2
15) The cube of n n^3
16) b increased by 5 $5+b$
17) From a subtract b $a-b$
18) the sum of a, b, and c $a+b+c$

B. 19) 4 times m $4m$

20) a^2 multiplied by d $d(a^2)$

21) s divided by y $\frac{s}{y}$

22) the ratio of d to 12 $\frac{d}{12}$

23) the quotient of c and 3 $\frac{c}{3}$

24) What part of k is 9 $\frac{k}{9}$

25) v^2 divided by 3 $\frac{v^2}{3}$

26) Double x $2x$

27) Triple y $3y$

28) p squared p^2

29) One-half q multiplied by r $r(\frac{1}{2}q)$

30) The product of 13 and s $13s$

31) Divide v by w $\frac{v}{w}$

32) Twice p divided by three $\frac{2p}{3}$

C. 33) Twice the radius (r) $2r$

34) Three times the side (s) $3s$

35) The principal (p) plus the interest (i) $p+i$

36) The circumference (c) divided by pi (π) $\frac{c}{\pi}$

37) The length (l) times the width (w) times the height (h) $l \cdot w \cdot h$

38) The profit (p) added to the cost (c) $p+c$

39) One-half the product of the altitude (a) and base (b) $\frac{1}{2}(ab)$

40) The sum of twice length (l) and twice the width (w) $2l+2w$

41) The cube of the edge (e) e^3

42) Twice pi (π) times the radius (r) times the sum of the height (h) and radius $(2\pi)(r)(h+r)$

43) The square root of the difference between the square of the hypothesis (h) and square of the base (b) $\sqrt{h^2-b^2}$

Use the correct operational symbol to express each statement, then perform the operation.

Example: Seven plus three divided by 2 is what ?

$$\frac{7+3}{2} = \frac{10}{2} = 5$$

1) Multiply 15 by 6 $6(15) = 90$

2) Divide 27 by 3 $\frac{27}{3}$

3) Add 26 and 30 $26 + 30$

4) 15 is how many times as large as 3? $\frac{15}{3} = 5$

5) What is the remainder of 90 minus 34? $90 - 34 = 56$

6) How many sevens are in 168? $\frac{168}{7} = 24$

7) Give the product of 15 and 17. $(15)(17)$

8) If 21 is increased by 29, what is the total? $21 + 29 = 50$

9) What does one thousand diminished by nine equal? $1000 - 9 = 991$

10) Increase 5 by four, less two. $(5+4) - 2 = 7$

11) What does eleven more than 30 equal? $30 + 11 = 41$

12) What does 99 decreased by 10 equal? $99 - 10 = 89$

13) When six is multiplied by three, what is the result? $3(6) = 18$

14) Subtract 21 from 90. $90 - 21 = 69$

15) Find the sum of 18 and 16. $18 + 16 = 34$

16) What is the product of 18 and 16? $(18)(16)$

17) 2 plus 8 divided by 4 times 12. $\frac{2+8}{4(12)}$

18) What is the product when the sum of 4 and 6 is multiplied by eight? $8(4+6) = 80$

19) What is the cube of 10? $10^3 = 1000$

20) The product of 2 and 4, decreased by 3 is what? $2(4) - 3 = 5$

Evaluating Algebraic Expressions

The value of an algebraic expression depends on the numerical value given to each variable of the expression. Usually, if these values change, the value of the expression changes.

How To

Evaluate an Algebraic Expression

Copy the expression

Substitute the given numerical value for each variable

Perform the indicated operations

Example:

Evaluate $c^2 + d^2$ if $c = 8$ and $d = 4$

Copy and substitude $c^2 + d^2 = 8^2 + 4^2$

Perform indicated operation $= 64 + 16$

$= 80$

Evaluate $\frac{x}{y} -3$ if $x = 4$ and $y = 2$

$$\frac{x}{y} -3 = \frac{4}{2} -3$$

$$= 2-3$$

$$= -1$$

Evaluate $2p^2 t^3$ if $p = 4$ and $t = -3$

$$2p^2 t^3 = 2\ (4)^2(-3)^3$$

$$= 2\ (16)(-27)$$

$$= 32\ (-27)$$

$$= -764$$

Evaluate each Expression

A. When a = 12 and b = 6

1) $a + b$ 18
2) $a - b$ 6
3) ab 72
4) $\frac{a}{b}$ 2
5) a^2 144
6) $7a$ 84
7) $4\ (a - b)$ 24
8) $a^2 - b^2$ 108

When x = 4 and y = 3

9) $x + 6y$ 22
10) $5\ x\ y$ 60
11) $4x - 8y$ -8
12) $x\ (x - y)$ 4
13) $9\ x^2 y$ 432
14) $9\ x\ y^2$ 324
15) $(9\ x\ y)^2$ 11664
16) $x^2 - y^2$ 7
17) $(x + y)^2$ 49
18) $\frac{x + y}{2x - y}$ $1\frac{2}{5}$

When m = 8, n = -2 and x = 4

19) $3\ m\ n\ x$ -192
20) $10\ m\ n - 7\ mx$ -384
21) $(m + n)\ (m - n)$ 60
22) $m - n\ (m + n)$ 20
23) $5m^2 + 2mx - 3x^2$ 336
24) $\frac{(n - x)^2}{n^2 - x^2}$ -3

B When a = 4, b = 2 and c = 3

25) $a^2 + b^2 + c^2$ 29
26) $a - b + c^2$ 11
27) $a^2 + b - 2c^2$ -12
28) $a^2 + b - c^2$ 9
29) $a^2 + 2b + 3c$ 29
30) $(a + b + c)^2$ 81
31) $(ac)^3 + b$ 1730
32) $\frac{6b}{c} + 3a^2$ 436
33) $\frac{c^2 - 27}{ab}$ $2\frac{1}{4}$
34) $\frac{(2b - c)^3 + b^3}{(2\ a - c + b)^3}$ $\frac{9}{343}$

Evaluate each expression:

C When $r = 1$, $s = 3$, $t = 12$, $u = 0$, $v = 5$ and $w = \frac{1}{2}$

35) $(v \cdot v - v) - v$ 15

36) $(2w - r)(2w + r)$ 0

37) $(3r + t)(3r + t)$ 225

38) $\frac{4w + 3r}{7}$ $\frac{5}{7}$

39) $\frac{6w + 5}{7v}$ $\frac{8}{35}$

40) $\frac{3v + t}{5s - t}$ 9

41) $\frac{16 s \cdot w}{(4s)(2r)}$ 1

42) $\frac{t(2s + v)}{t(2s - v)}$ 12

43) $\frac{2w(s + r)}{2w(s - r)}$ 2

44) $\frac{st - u}{5t + u}$ $\frac{36}{65}$

45) $\frac{2r + st}{v + uw}$ $7\frac{3}{5}$

46) $\frac{2r \div 2s + t}{u + .5}$ 30

47) $\frac{5 + r + 6s}{t(u + 2u)}$ 4

48) $\frac{2s + 27}{uv + 2w}$ 16

49) $\frac{rst}{tw}$ $\frac{1}{5}$

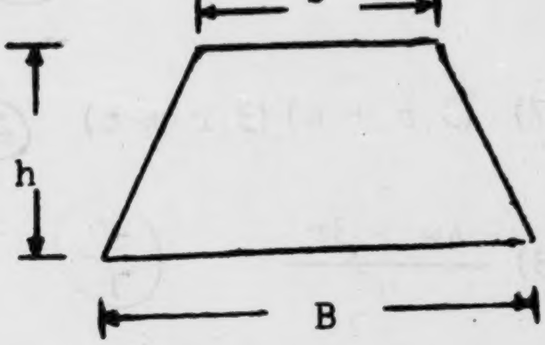
50) $\frac{4(w + 6)}{s(rt + 1)}$ $\frac{26}{39}$

The following algebraic expressions are found in geometry, physics, and machine shop. Evaluate each by replacing the variable as indicated.

B 1) Area of a trapezoid: $h \frac{(b + B)}{2}$

let h = 4", b = 6" and B = 7"

52



2) Distance traveled in a given second under acceleration. $\frac{9}{2}(at - 1)$;

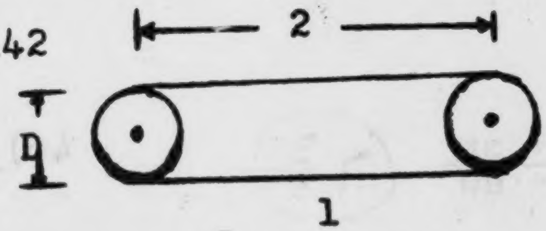
let a = 20 ft/sec/sec, t = 6 sec

535 $\frac{1}{2}$

3) Length of an open belt over pulleys of equal diameter: 2 L + π D

let L = 12.250, D = 3.000, π = 3.142

33.926



4) Degrees centigrade to degrees Fahrenheit: $\frac{5}{9}(F - 32)$;

let F = 77

25°C

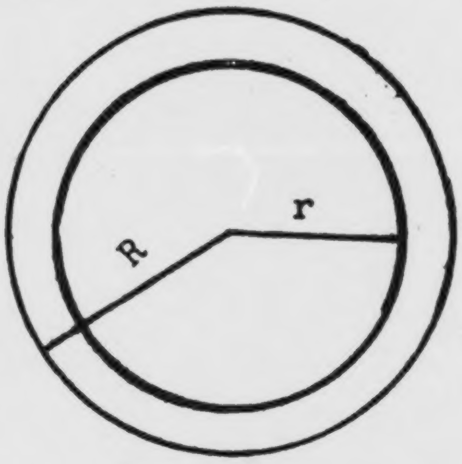
5) Area of a circular cross section: π (R - r)(R + r);

553 $\frac{1}{7}$

R = 24"

r = 20"

$\pi = \frac{22}{7}$



A Evaluate each:

1) $2x^2 + 4x + 5; \quad x = 3$ 35

2) $5y^2 - 3y + 4; \quad y = 1$ 6

3) $7t^3 + t^2 - t; \quad t = 2$ 58

4) $a^3 - 2a^2 + a + 4; a = 5$ 84

5) $v^5 + 3v^4 - v^3 + v; v = 0$ 0

6) $w^{10} + w^5 + w + 9; w = 0$ 9

B Let $x = 5$, $y = 2$ and $t = 3$

7) $x^2 + y^2 + t^2$ 38

8) $x - y^2 - t^2$ -8

9) $x^2 + y + t^2$ 36

10) $x - y + t^2$ 12

11) $x^2 + y^2 - 2t^2$ 11

12) $x^2 - y^2 + t^2$ 30

13) $x^2 + y - t^2$ 18

14) $\frac{2x^2 + xy}{20t}$ 1

15) $\frac{t^3 - 27}{xy}$ 0

16) $\frac{7y^2t - 2x^2}{xy}$ $3\frac{2}{5}$

17) $(xt)^3 + y^6$ 3439

18) $\left(\frac{6y}{2}\right)^3 + 3x^2$ 291

19) $\frac{(x - t)^4 - y^4}{x - y^2}$ 0

20) $\frac{(2y - t)^3 + y^3}{(2x - t + y)^3}$ $\frac{1}{81}$

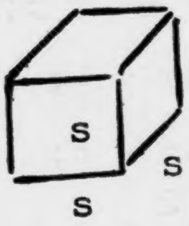
C. Evaluate:

21) Area of a square: s^2 ;

let s = 15 cm 225 sq cm

Volume of a cube: s^3

let s = 15 cm 3375 cu cm

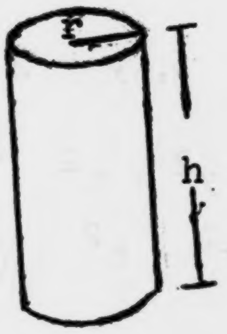


22) Volume of a circular cylinder:

$\pi r^2 h$, let $\pi = 3.14$

$r = 1.25''$ 46.875

$h = 12.0''$



23) Law of gravitation: $\frac{G\,m\,M}{r^2}$

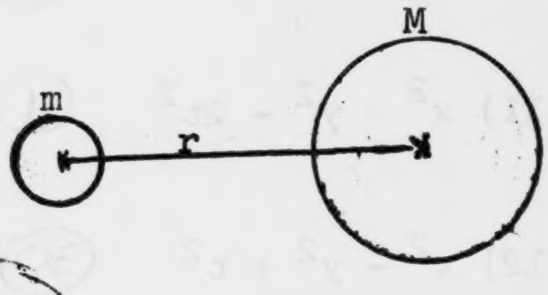
let $G = .0000000667$

$m = 100{,}000g$

$M = 900{,}000g$

$r = 1000$ cm

$\frac{603}{100000}$



Earlier, we defined a term as "an algebraic expression written as product or quotient of numerials or variables or both."

Terms can be classified as Like or Unlike. We are particularly interested in being able to Identify, Group, Add, and Subtract like terms.

Like terms - **are numerical or variable terms whose variable factors are the same** (i.e. contain the same variable with the same exponents.

$7a$, $-8a$ and a are like terms

$-14t^2$, $\frac{1}{4}t^2$ and 3^2t^2 are like terms

$4\ x^2yt^3$, $-\ 13\ x^2y\ t^3$ and $x^2y\ t^3$ are like terms

$7a$ and $14n$ are unlike terms because the variables are different

$2x^3$ and $3x^2$ are unlike terms because the exponents are different

Name the Like terms in each group:

(a)	(b)	(c)	(d)	(e)
$2a$	$7b$	$5xy$	$.25c$	$2mn$
$3a^2$	8	$5x^2y$	$-4c$	$2(mn)^2$
$14a^2b$	$9b$	$4x$	$\frac{1}{2}c$	mn
a	$4ab$	yx	$\frac{1}{2}c$	n^2n^2

Algebraic expressions can be simplified by COMBINING similar terms.

Examples;

1) $8x + 3y + 2x - 3y$

$(8x + 2x) + (3y - 3y) = 10x + 0$

$= 10x$

2) $5a + 4a - 2a + 3$

$(5a + 4a - 2a) + 3 = (9a - 2a) + 3$

$= 7a + 3$

3) $4ab^2 + 4ab^2 - 3(2ab^2 - ab^2)$

$4ab^2 + 4ab^2 - 3(ab^2)$

$8ab^2 - 3ab^2$

$5ab^2$

We group similar terms before doing the indicated operation.

A. Copy and simplify (combine like terms)

1) $7x + 9x$ 16x
22) $15ab + 37ab$ 52ab
3) $100a - 35$ 100-35
4) $75b - 52b$ 23b
5) $13a + a + 16a$ 30a
6) $15x - x - 7x$ 7x
7) $5x + 7x + 6$ 12x+6
8) $9n + 6n + 3$ 15n+3
9) $2s + 3r + s + r$ 3s+4r
10) $3x + y + x + y$ 4x+2y
11) $2a + 3b + 4c - d$ 2a+3b+4c-d
12) $6u - 5v - 3w - 4$ 6u-5v-3w-4
13) $15n + 13 - 5n + 8$ 10n+21
14) $18z + 27 + 8t - 17$ 18z+8t+10
15) $5a + 6b - a + b - 4a$ 7b
16) $3x + x + 5 + 24 + 1$ 4x+30
17) $16 + 16a + 5b - 15 - 6$ 16a+5b-5
18) $19s + 6t - t - 17$ 19s+5t-17
19) $8ab + 7a + 6ab - a$ 14ab+6a
20) $7xy + 3x - 2xy + 9x$ 5xy+12x

$$3xy + xy + 4x^2y - 2xy - x^2y$$
$$(3xy + xy - 2xy) + (4x^2y - x^2y)$$
$$4xy - 2xy + 3x^2y$$
$$2xy + 3x^2y$$

B. Combine similar terms:

21) $2a - 3 + 5a - 10a + 8$ $5-3a$

22) $4r - 7 + 3r + 9 - 8r$ $2-r$

23) $-6x + 5 -2x + x - 12$ $-7x-7$

24) $-8y + 8 - 6y - y + 14$ $22-15y$

25) $-4nt + 8 - 6 - nt + 3nt$ $2-2nt$

26) $-9hk + 5hk - 8 + hk + 5$ $-3hk-3$

27) $4r + 5s - r + s - 6r$ $4s-3r$

28) $16a - 9b - r + s - 6r$ $16a-9b-7r+s$

29) $16a - 9b - a + b - 7b$ $15a-15b$

30) $1\cdot 5n - 8 - 3.5n + 5$ $-10n-3$

31) $\frac{1}{3}y - \frac{3}{2} - \frac{2}{3}y + 1 + y$ $\frac{2}{3y} - \frac{1}{2}$

32) $-3a + b + 4a + a - b$ $2a$

33) $9u - a + 5 - 6u - 6 + 2u$ $5u-a-1$

34) $33k^3 - k^3 + 4k^3 - 40k^3$ $-4k^3$

35) $xyt - 8xyt - 2xyt$ $-9xyt$

36) $-d^2 - .1d^2 + .5d^2 + 1.8d^2$ $.2d^2$

37) $4x^2 - 5x - 6x^2 + 7x$ $2x-2x^2$

38) $-13y + 2y^2 - 4y^2 + 6y$ $-7y-2y^2$

39) $m^2 - 2u^2 - 3 - m^2 - 4m$ $-2u-3-4m$

40) $u^3 - 2u^2 + 4u + 3u^2 - 4u$ u^3+u^2

41) $2p^3 + 2p - 3p^3$ $2p-p^3$

42) $(rs)^2 + r^2s^2 - 5 + 6$ $2r^2s^2+1$

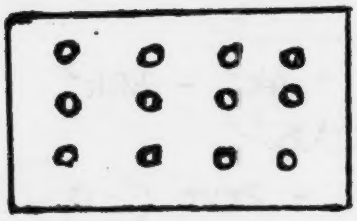
Distributive Property

Can you simplify the following?

$$10\ (3w + v) + 6\ (3w - v)$$

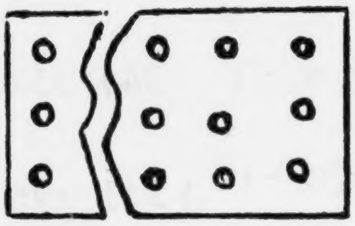
Problems of this type are not difficult if one understands the "Distributive Property."

Lets take a good look at the Distributive Property and see how it works.



3 x 4

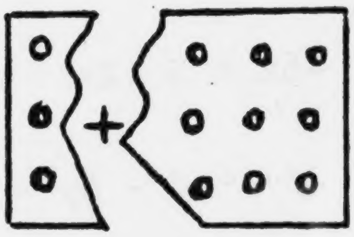
12



3 (1 + 3)

3 (4)

12



3 (1 + 3)

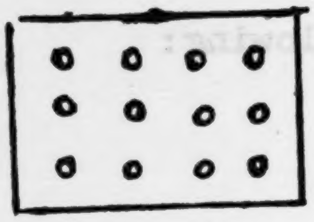
3x1 + 3x3

3 + 9

12

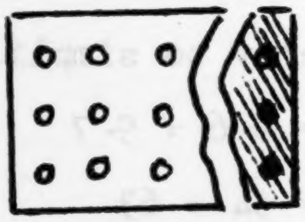
The 3 is distributive throughout the two parts.

The Distributive Property relates to Multiplication and Addition and Multiplication and Subtraction.



3×4

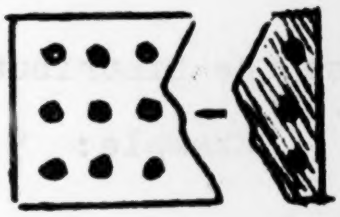
12



$3\ (4 - 1)$

$3\ (3)$

9



$3\ (4 - 1)$

$3 \times 4 - 3 \times 1$

$12 - 3$

9

Back to our problem:

$$10\ (3w + v) + 6\ (3w - v)$$
$$10\ (3w) + 10\ (v) + 6\ (3w) - 6\ (v)$$
$$30w + 10v + 18w - 6v$$
$$(30w + 18w) + 10v - 6v$$
$$48w + 4v$$

Generally:

$$a\ (b + c) = ab + ac$$

$$a\ (b - c) = ab - ac$$

Use the Distributive Property to simplify the following:

Example: $9\ (6 + 7) = 9 \cdot 6 + 9 \cdot 7$

$= 54 + 63$

$= 117$

A 1) $6\ (3 + 4)$ 42

2) $2\ (8 - 4)$ 8

3) $4\ (7 - 2)$ 49

4) $12\ (13 - 2)$ 132

5) $8\ (2 + 3 + 4)$ 72

6) $(3 + 4)\ 7$ 49

Write these products as a sum: Example: $5\ (a + b) = 5a + 5b$

7) $4\ (2 + 3)$ $8 + 12$

8) $3\ (a + b - c)$ $3a + 3b - 3c$

9) $(6 - 2)\ 33$ $198 - 66$

10) $c\ (4 + 2)$ $4c + 2c$

11) $k\ (7a + 4b)$ $7ak + 4bk$

12) $y\ (y + 3)$ $y^2 + 3y$

B Write these sums as a product: Example: $4a + 3a = a\ (4 + 3)$

13) $3b + 2b$ $b(3+2)$

14) $9\ (8) + 9\ (6)$ $9(8+6)$

15) $7k - 3k$ $k(7-3)$

16) $5y + 8y - 9y$ $y(5+8-9)$

17) $12x + 3x$ $x(12+3)$

18) $3y + 3$ $3(y+1)$

19) $3nx - x$ $x(3n-1)$

20) $xy2 - x^2y$ $xy(y-x)$

A. **Combine similar terms:**

$$3\ (a + b) + 7\ (a + b)$$
$$3a + 3b + 7a + 7b$$
$$(3a + 7a) + (3b + 7b)$$
$$10a + 10b$$

1) 9(m + n) + 7 (2m + n) 23m + 16n   5) 7 (6e + 3) + 5 (4e - 3) 62e + 6

2) 8(3 + a) + 4 (3 + a) 36 + 12a   6) 10 (3w + v) + 6 (3w - v) 48w + 4v

3) 2(a + 5) + 3 (a - 2) 5a + 4   7) 9 (2r + 8t) + 4 (2r - 8t) 26r - 40t

4) 4 (d + 5) + 3 (2d - 1) 10d + 17   8) 3 (a + 2b + 1) + 2 (a - 1) 5a + 6b + 1

9) 4 (r +3s + 2) + 7 (s - 1 + 3r) 25r + 19s + 1

B 10) - 2 (r + 3s) + 5 (-r -s) -7r - 11s   12) 3 (p -2q) - (5q - 2p) 5p - 11q

11) -7 (a - 3b) + 9 (-b +a) 2a + 18b   13) -4 (-7v + t) - (-t - 3v) 31v - 3t

14) 3 [8a + 5 (3-a)] - 17 9a + 28

15) 6 (2r + s) + 2 [5r + 3 (4s - r + 1)] 16r + 30s + 6

16) 19 + 2 [4b + 3 (5b -2)] 7 + 38b

17) 5 [4 (2m + n + 3) *6m - 1] +2 (5 m - n) 38m + 55

18) 3 [-6 + 2(a - 4)] + 26 6a - 16

19) -7n - 5[2(1 + 2n) -3] 5 - 27n

20) -10h -4 [-1 -3 (3h - 2)] 26h - 20

Can you solve this problem ?

"Five more than three time a number is 35. What is the number?"

We could do it very easily algebraically

In order to solve the above problem algebraically we first must know how to solve an "Equation in One Variable."

What is an equation?

An equation is an algebraic sentence composed of algebraic expressions related by the symbol = (is equal to).

The above problem may be expressed algebraically:

$$3n + 5 = 35$$

Where:

N represents "the number to be found"

3N represents "3 times the number"

+5 represents "5 more than"

=35 represents " is 35"

$$\underbrace{3n + 5}_{\text{Left Member}} = \underbrace{35}_{\text{Right Member}}$$

$$3n + 5 = 35$$

Solution:

$$3n + 5 = 35$$

$$3n + 5 - 5 = 35 - 5$$

$$3n = 30$$

$$\frac{3n}{3} = \frac{30}{3}$$

$$N = 10$$

The solution or root of $3n + 5 = 35$ is 10, since $3 \cdot 10 + 5 = 35$ (i.e. when 10 is substituted for the variable and each member is evaluated, they are equal.

To solve an equation, change the given equation to a simpler equation which has only the variable by itself as one member and a constant or numeral as the other. These changes are based on four properties.

Properties of Equality

If $a = b$, then $a + c = b + c$ (Addition)

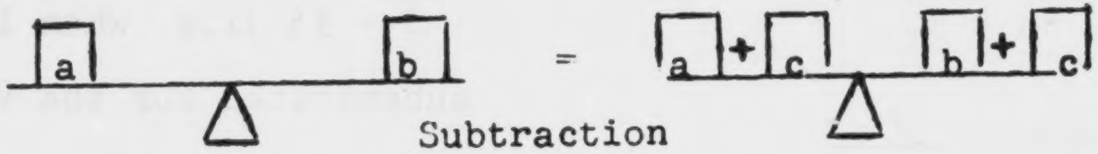
If $a = b$, then $a - c = b - c$ (Subtraction)

If $a = b$, then $ac = bc$ (Multiplication)

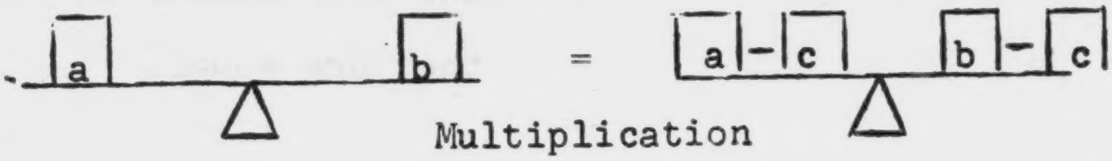
If $a = b$, then $\frac{a}{c} = \frac{b}{c}$ (Division)

An equation may be thought of as a "Balance". To keep the equation balanced, any change on one side of the equality sign must be balanced by equal change on the other side.

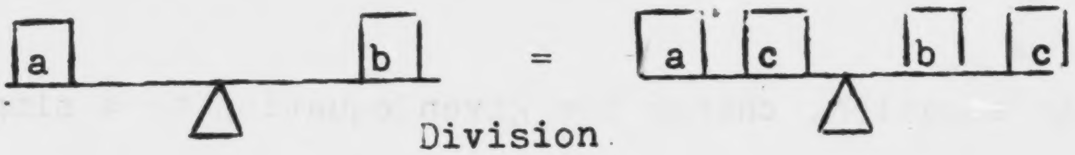
Addition



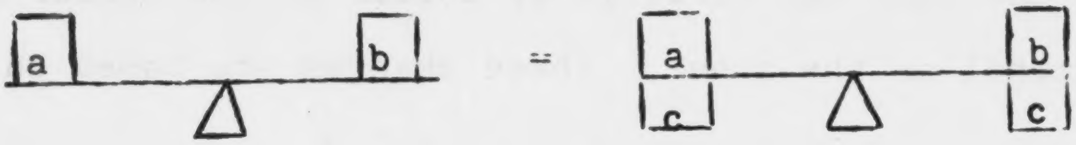
Subtraction



Multiplication



Division



Solving by use of Addition Property

$$x - 3 = 15$$

$$x - 3 + 3 = 15 + 3$$

$$x = 18$$

Solving by use of Subtraction Property

$$x + 5 = 13$$

$$x + 5 - 5 = 13 - 5$$

$$x = 8$$

Solving by use of Division Property

$$2x = 17$$

$$\frac{2}{2} = \frac{17}{2}$$

$$x = 8\frac{1}{2}$$

Solving the use of Multiplication Property

$$\frac{x}{4} = 3$$

$$(4)\frac{x}{4} = 3(4)$$

$$x = 12$$

Solve using the Addition and Subtraction Properties of Equality:

Example:

The inverse of
Addition
is Subtraction

$y + 4 = 16$

$y + 4 - 4 = 16 - 4$

$y = 12$

$p - 7 = 23$

$p - 7 + 7 = 23 + 7$

$p = 30$

The inverse
of
Subtraction
is Addition

A. 1) $x + 2 = 6$ 4
2) $x - 1 = 8$ 9
3) $y - 6 = 7$ 13
4) $c + 18 = 31$ 13
5) $48 + w = 75$ 27
6) $n - 9 = 11$ 20
7) $h - 18 = 6$ 24
8) $k + 3 = 15$ 12
9) $t - 4 = 25$ 21
10) $r + 5 = 36$ 31

11) $87 = 40 + x$ 47
12) $36 = 19 + d$ 17
13) $18 = x - 6$ 24
14) $65 = n - 5$ 70
15) $29 + p = 106$ 77
16) $210 = 96 + r$ 114
17) $n + 80 = 80$ 0
18) $175 = t + 82$ 93
19) $24 = m - 7$ 31
20) $36 = n - 24$ 60

B. 21) $p + .8 = 1.1$ .3
22) $1 - .5 = 3.2$ 3.7
23) $t + .2 = .7$ .5
24) $h - .78 = 9.2$ 9.98
25) $k - .37 = 4.1$ 4.47
26) $.8 = n - 75.7$ 76.5
27) $51 = t - 51$ 1.02

28) $c + \$.09 = \$.23$ \$.14
29) $\$50 = i + \$42.50$ \$7.50
30) $6.5 = 4.8 + n$ 1.7
31) $9.6 = n - 7$ 16.6
32) $b - 6 = -6$ 0
33) $y - 1 = -9$ -8
34) $a + \$.08 = \$.75$ \$.67

When the operation is Addition we solve by subtracting
When the operation is Subtraction we solve by Adding

C. 35) $t + \frac{3}{4} = 4$ $3\frac{1}{4}$

36) $1\frac{1}{2} + x = 3\frac{5}{8}$ $2\frac{1}{8}$

37) $8\frac{1}{3} = 4\frac{1}{4} + d$ $4\frac{1}{12}$

38) $1 - \frac{3}{4} = \frac{1}{4}$ 1

39) $\frac{3}{10} = T - \frac{13}{10}$ $1\frac{3}{5}$

40) $p - \frac{5}{6} = 3\frac{1}{6}$ 4

41) $\frac{3}{8} = \frac{1}{4} + x$ $\frac{1}{8}$

42) $\frac{1}{2} = d - 1\frac{3}{4}$ $2\frac{1}{4}$

43) $x - 2\frac{1}{2} = 2\frac{1}{2}$ 5

44) $\frac{2}{3} = Q - \frac{5}{8}$ $1\frac{7}{24}$

45) $h - \frac{2}{3} = 3$ $3\frac{2}{3}$

46) $\frac{17}{11} = s + \frac{5}{11}$ $1\frac{1}{11}$

47) $x + 4 = 12$ 8

48) $\frac{1}{3} + > = 4$ $3\frac{2}{3}$

49) $d + 4 = \frac{1}{2} + 6\frac{1}{2}$ 3

50) $s + \frac{1}{4} = \frac{1}{12}$ $-\frac{1}{6}$

Solve using the Multiplication and Division Properties of Equality:

Example:

The inverse of Multiplication is Division

$5a = 45$

$\frac{5a}{5} = \frac{45}{5}$

$a = 9$

$\frac{d}{z} = 19$

$(z)\,\frac{d}{z} = 19(z)$

$d = 38$

The inverse of Division is Multiplication

A 1) $9c = 54$ 6

2) $14n = 42$ 3

3) $8y = 0$ 0

4) $2r = 18$ 9

5) $10w = 10$ 1

6) $5c = 8$ $1\frac{3}{5}$

7) $4y = 1$ $\frac{1}{4}$

8) $\frac{s}{14} = 24$ 96

9) $\frac{b}{7} = 3$ 21

10) $\frac{n}{5} = 0$ 0

11) $\frac{t}{8} = 8$ 64

12) $12d = 10$ $\frac{5}{6}$

13) $4 = 5b$ $\frac{4}{5}$

14) $54 = 8r$ $6\frac{3}{4}$

15) $9 = 7t$ $1\frac{2}{7}$

16) $0 = 4x$ 0

17) $12 = 5t$ $2\frac{2}{5}$

18) $3 = 3p$ 1

19) $30 = \frac{w}{5}$ 150

20) $3 = \frac{K}{12}$ 36

21) $45 = \frac{m}{5}$ 225

22) $1 = \frac{s}{9}$ 9

When the operation is Multiplication we solve by Dividing

When the operation is Division we solve by Multiplying

B 23) $8x = -32$ -4

24) $-5m = 40$ 8

25) $-7y = 56$ 8

26) $-x = -10$ 10

27) $-64 = -4c$ 16

28) $\frac{y}{-3} = 12$ -36

29) $\frac{a}{-6} = -18$ 108

30) $-8 = \frac{d}{-11}$ 88

31) $-5 = \frac{t}{7}$ -35

32) $-5 = -x$ 5

C 33) $\frac{1}{4} c = 20$ 80

34) $3.2(t) = 12.8$ 4

35) $\frac{x}{1.8} = 1.9$ 3.42

36) $.36y = 4.8$ $\frac{4.8}{.36}$

37) $.14(y) = 14$ 100

38) $1.6 = \frac{h}{1.5}$ 2.4

How would you solve $\frac{7}{8}n = 42$?

The term $\frac{7}{8}n$ tells you to multiply n by 7 and then divide the results by 8. If we think of Inverse Operations, we would proceed like so:

Steps:

1) $\frac{7}{8}n = 42$

2) $8\left(\frac{7}{8}n\right) = 42\ (8)$

3 3) $7n = 836$

4) $\frac{7n}{7} = \frac{336}{7}$

5) $n = 48$

We can combine steps 2 and 4, thus eliminating step 3 by multiplying $\frac{7}{8}n$ by its "Reciprocal".

Reciprocals —— is a pair of numbers who's product is 1.

Let a be any number, then the recipocal of a is $\frac{1}{a}$, because,

$$a \times \frac{1}{a} = 1$$

$$\text{If } a = 2, \text{ then } \frac{1}{a} = \frac{1}{2}$$

$$2 \cdot \frac{1}{2} = 1$$

$$\text{If } \frac{1}{a} = \frac{1}{3}, \text{ then } a = 3$$

$$\frac{1}{3} \cdot 3 = 1$$

Note: Zero does not have a reciprocal.

Number	Reciprocal
1	1
-1	-1
7	$\frac{1}{7}$
-5	$-\frac{1}{5}$

Number	Reciprocal
$\frac{1}{4}$	4
$-\frac{3}{8}$	$-\frac{8}{3}$
$\frac{5}{6}$	$\frac{6}{5}$
$\frac{3}{4}$	$\frac{4}{3}$

Thus the solution of $\frac{7}{8}n = 42$

becomes $\frac{7}{8}n = 42$

Multiply by the Reciprocal of $\frac{7}{8}$

$$\frac{8}{7}\left(\frac{7}{8}n\right) = 42\left(\frac{8}{7}\right)$$

$$n = 48$$

Solve using the idea of Reciprocals

(Multiplicative Inverse)

A 1) $\frac{3}{4}p = 24$ 32

2) $\frac{1}{8}t = 7$ 56

3) $\frac{4}{5}y = 24$ 30

4) $\frac{8}{9} = 6n$ $\frac{4}{27}$

5) $4 = \frac{3}{4}y$ $5\frac{1}{3}$

6) $5 = \frac{5}{9}t$ 9

7) $24 = \frac{2}{3}r$ 36

8) $9 = \frac{3}{5}k$ 15

B 9) $\frac{5}{3} = \frac{1}{12}x$ 20

10) $\frac{3}{8} = \frac{1}{24}y$ 9

11) $\frac{5}{4}w = 20$ 16

12) $\frac{1}{2}r = 3\frac{1}{2}$ $\frac{1}{7}$

13) $\frac{1}{3}v = 4\frac{2}{3}$ 14

14) $3\frac{1}{2}y = 14$ 4

15) $2\frac{1}{4}n = 13\frac{1}{2}$ 6

16) $\frac{2}{3} = 3\frac{1}{4}p$ $\frac{8}{39}$

Let's use our algebra skill to solve some word problems.

Example:

Multiply a number by 2 any you get 6. What is the number?

Step (1) Translate the problem into an algebraic equation.

Step (2) Solve

$$2n = 6$$

$$\frac{2n}{2} = \frac{6}{2}$$

$$n = 3$$

The number is 3

A Write an equation for each and solve:

1) Multiply a number by 9, and you get 45. $9x = 45; x = 5$

2) Double a number, and you get 52. $2x = 52; x = 26$

3) Add 5 to a number, and you get 11. $x + 5 = 11; x = 6$

4) Subtract 4 from a number, and you get 15. $x - 4 = 15; x = 19$

5) Add 20 to a number, and you get 39. $x + 20 = 39; x = 19$

6) Subtract 2 from a number, and you get 5. $x - 2 = 5; x = 7$

7) Multiply a number by 1, and you get 8. $1x = 8; x = 8$

8) Multiply a number, by $\frac{1}{3}$, then multiply this product by 2, and you get 30. $2(\frac{1}{3}x) = 30; x = 45$

9) Multiply a number by 5, then multiply the product by $\frac{1}{5}$, and you get 13. $\frac{1}{5}(5x) = 13; x = 13$

10) Add 4 to a number, subtract 4 from the sum, and you get 39. $(x + 4) - 4 = 39; x = 39$

11) Add 7 to a number, then subtract 4 from the sum, and you get 5. $(x + 7) - 4 = 5; x = 2$

12) Double a number, add 2 to the product, and you get 15. $2x + 2 = 15; x = 6\frac{1}{2}$

Combining Terms and Using Transformation Principles

The solution of more difficult equations may involve using more than one Property of Equality and combining similar terms.

Consider;

$7x + 2 = 72$

$7x + 2 - 2 = 72 - 2$ Subtraction Property of Equality

$7x = 70$

$\frac{7x}{7} = \frac{70}{7}$ Division Property of Equality

$x = 10$

$7y + 3y = 90$

$10y = 90$ Combining Similar terms

$\frac{10y}{10} = \frac{90}{10}$ Division Property of Equality

$y = 9$

$7x + 3x - 4 = 12 + 39$

$10x - 4 = 51$ Combining Similar Terms

$10x - 4 + 4 = 51 + 4$ Addition Property of Equality

$10x = 55$ Combining Similar Terms

$\frac{10x}{10} = 55$ Division Property of Equality

$x = 5.5$

A Solve:

1) $2b + 18 = 46$ 14

2) $3 + 5n = 62$ $11\frac{4}{5}$

3) $51 = 9y + 6$ 5

4) $120 = 76 + 2w$ 22

5) $22h + 154 = 374$ 10

6) $p + .06p = 689$ 650

7) $6a - 7 = 29$ 6

8) $37 = 14b - 19$ 4

9) $n + n = 50$ 25

10) $9x + 3x = 84$ 7

11) $0 = 10n - 30$ 3

12) $7y - y = 18$ 3

B 13) $3x + 5x = 34 - 10$ 3

14) $7n - 3n = 40 + 16$ 6

15) $28 = 8x + 10x + 10$ 1

16) $45 = 7x + 8x + 30$ 1

17) $x - \frac{1}{2} - 10 = 0$ $10\frac{1}{2}$

18) $\frac{6}{5}v - v - 5 = 0$ 25

19) $13a + 2a + 5a + 85 = 95$ $\frac{1}{2}$

20) $8b + 2b + 7b + 173 = 176$ $\frac{3}{17}$

21) $5.6x + 2.4x + 176 = 176$ 0

22) $8.3y + 2.7y + 154 = 154$ 0

23) $57 = 8y + 25$ 4

24) $127 = 45t + 37$ 2

25) $0 = 17h - 102$ 6

26) $0 = 19n - 57$ 3

27) $26 = 14 + 4n$ 3

28) $36 = 17 + 6r$ $3\frac{1}{6}$

29) $\frac{3}{4}p + \frac{1}{8} = 2$ $3\frac{5}{7}$

30) $\frac{5}{8}m + \frac{3}{4} = 7$ $14\frac{14}{15}$

31) $\frac{2}{3}z - \frac{2}{3} = 12$ 19

32) $\frac{3}{4}k - \frac{3}{4} = 24$ 33

33) $23.6x - x = 45.2$ 2

34) $4.5a - a = 70$ 20

35) $\frac{1}{4}t + \frac{1}{4}t = 3.4$ $6\frac{4}{5}$

36) $\frac{k}{2} - \frac{k}{6} = 2.9$ 8.7

37) $\frac{17}{6}m - \frac{5}{6}m = 1$ $\frac{1}{2}$

C 38) $t + 14 + 2t + 5 + 4t = 51$ $4\frac{4}{7}$

39) $5a + 6 - 2a + 2 - a = 56$ 24

40) $11 + 4b - 2b = 73 - 6$ 28

41) $25 + 6a + a + 7 = 32$ 0

42) $7n + 5 - 3 - n = 8$ 0

43) $25s - .5 - 5s = 0$ 40

44) $x + 2 + 4x = 6x - 8$ 10

45) $s + 4 + 7s - 2 = 6s + 14$ 6

46) $r + 2r = 10 - 4 + r$ 3

47) $n + 16 - 12 - 4n = 2n - 24$ 5

48) $16 + 14t = 12t + 12$ 14

49) $17 + 16s = 12 + 20s$ $1\frac{1}{4}$

50) $x + 14 = 25x + 2$ $\frac{1}{2}$

Equations With Variables in Both Numbers

Consider: What properties are used in each case ?

$7v = 45 + 2v$

$7v - 2v = 45$? Property

$5v = 45$ a)

$\frac{5v}{5} = \frac{45}{5}$ b)

$v = 9$

$x + 4x - 8 = 6 + 2x + 1$

$5x - 8 = 7 + 2x$ a)

$5x - 2x = 7 + 8$ Adding and Subtracting two terms at the same time

$3x = 15$ b)

$\frac{3x}{3} = \frac{15}{3}$ c)

$x = 5$

$1 + 3\ (3s + 4) = 15 + 6s$

$1 + 3 \cdot 3s + 3 \cdot 4 = 15 + 6s$ Distributive Property

$1 + 9s + 12 = 15 + 6s$ a)

$9s + 13 = 15 + 6s$ b)

$9s - 6s = 15 - 13$ c)

$3s = 2$ d)

$\frac{3s}{3} = \frac{2}{3}$ e)

$s = \frac{2}{3}$

Example:

$$\begin{aligned} 9d + 3\ (5 + d) &= 2\ (2d + 1) \\ 3d + 3\cdot 5 + 3d &= 2\cdot 2d + 2\cdot 1 \\ 9d + 15 + 3d &= 4d + 2 \\ 12d + 15 &= 4d + 2 \\ 12d - 4d &= 2 - 15 \\ 8d &= -13 \\ \frac{8d}{8} &= \frac{-13}{8} \\ d &= -1\ \frac{5}{8} \end{aligned}$$

A Solve:

1) $7v = 45 + 2v$ 9
2) $9u = 6u + 39$ 13
3) $6L = 18 - 3L$ 2
4) $5b = 28 - 2b$ 4
5) $11x = 8 + 5x$ $1\frac{1}{3}$
6) $4y = 8 + 2y$ 4

7) $12 - 3r = 3r$ 2
8) $9h - 35 = 0$ $3\frac{8}{9}$
9) $5 + 2b = 7b$ 1
10) $8a = 5a + 18$ 6
11) $12 - y = 5y$ 2
12) $b + 28 = 6b$ $5\frac{3}{5}$

B 13) $4t + 2 = 2t + 8$ 2
14) $5w + 2 = w + 7$ $1\frac{1}{4}$
15) $7c - 7 = 15 - c$ $2\frac{3}{4}$
16) $12a - 3 = 4 - 2a$ 2
17) $4r + 2 = 2r + 2$ 0
18) $16 + 4y = 10y - 20$ $\frac{1}{6}$

19) $24x - 24 = 12 + 2x$ $1\frac{7}{18}$
20) $10w + 6 = 504 + 8w$ 249
21) $12n + 8 = 18 - 6n$ $\frac{5}{9}$
22) $19r + 4 = 19 + 14r$ 3
23) $7f - 1 = 29 + f$ 5
24) $8u + 2 = 13 - 3u$ 1

C Solve:

25) $6 + 4\ (2 - t) = 3t$ 2

26) $7m + 5\ (3 - m) = 19$ 2

27) $10 + 18x - 2 = 2x + 12 + 4x$ $\frac{1}{3}$

28) $4(b + 1) + 9 = 2\ (3b - 4) + b$ 7

29) $5\ (2y + 3) - 4y = 3(2 + y) + 31$ $7\frac{1}{3}$

30) $3(t + 4) - 3 = \frac{1}{2}\ (10 + 4t)$ 1

31) $12\ (\frac{x}{3} - \frac{1}{2}) = x + 21$ 9

Formulas

The word formula in algebra means, a mathematical sentence stating the equality of two quantities. A general knowledge of formulas and how they work can be very useful in everyday life. When you go to the store and buy more than one item that is market 20¢ each, the total cost (c) is equal to the number of items purchased (n) times 20

$$c = .20n$$

This formula will give you the cost no matter how many of the items you buy.

ORAL

Complete the following:

Cost per Item	Number of Item	Total Cost
20¢	3	? 60¢
5¢	8	? 40¢
4¢	7	? 28¢
$2.00	3	? $6.00
.50	6	? $3.00
$1.25	4	? $5.00

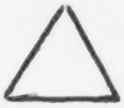
Write each formula algebraically:

Perimeter

1) Rectangle:

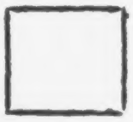
Perimeter is equal to twice the length (L) plus twice the width (w) $P = 2L + 2w$

2) Triangle:



Permeter is equal to the length of a side (s) plus the length of side (b) plus the length of side (c) $P = s + b + c$

3) Square:



Perimeter is equal to four times the length (L) of a side (s) $P = 4s$

4) Circle:

a) Circumference is equal to Pi times the diameter (d) $C = \pi d$

b) Circumference is equal to two times Pi times the radius (r) $C = 2\pi r$

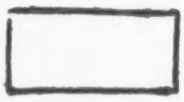
Area

5) Circle: Area is equal to Pi times the square of the radius (r) $A = \pi r^2$

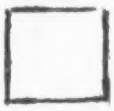
6) Parallelogram: Area is equal to the altitude (a) times the base (b)

$A = ab$

7) Rectangle: Area is equal to the length (L) times the width (w) $A = LW$



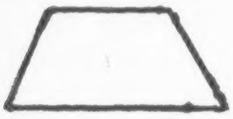
8) Square: Area is equal to the length of a side (s) squared $A = s^2$



9) Triangle: Area is equal to one-half the altitude (a) times the base (b)

$A = \frac{1}{2}ab$

10) Trapezoid: Area is equal to the height (h) times the sum of the two bases ($b_1 + b_2$)



$A = h(b_1 + b_2)$

To determine the value of any variable in a formula when the value of the other variables are known:

1) Copy the formula.
2) Substitute the given values for the variables.
3) Solve the resulting equation.

Formula: $P = 4s$ (perimeter of a square). Find the value of s when $s = 16$

$$P = 4s$$
$$P = 4 \cdot 16$$
$$P = 64$$

Formula: $A = Lw$ (area of a rectangle). Find the value of w when $A = 54$ and $L = 9$

1) $A = Lw$

2) $54 = 9w$

3) $\frac{54}{9} = \frac{9w}{9}$

$$6 = w$$
$$w = 6$$

Solve each of the following for the "Unknown" variable.

A

Formula	Known Variables	Unknown variable
1) $d = 2r$	$r = 85$	d 170
2) $A = bh$	$b = 32,\ h = 49$	A 1568
3) $C = \pi d$	$\pi = \frac{22}{7},\ d = 84$	C 264
4) $A = p + i$	$p = 620,\ i = 53$	A 673
5) $P = 2l + 2w$	$l = 73,\ w = 28$	P 202
6) $A = 90 - B$	$B = 47$	A 43
7) $i = prt$	$p = 650,\ r = .04,\ t = 2$	i 52
8) $V = lwh$	$l = 41,\ w = 27,\ h = 75$	V 83025
9) $A = 2\pi rh$	$\pi = 3.14,\ r = 48,\ h = 75$	A 11304
10) $A = s^2$	$s = 50$	A 2500
11) $V = e^3$	$e = 8$	V 512
12) $V = \pi r^2 h$	$\pi = 3.14,\ r = 40,\ h = 65$	V 326560
13) $A = \frac{1}{4}\pi d^2 h$	$\pi = \frac{22}{7},\ d = 56,\ h = 100$	A 246400
14) $d = \frac{c}{\pi}$	$c = 282.6,\ \pi = 3.14$	d 90
15) $P = 2l + 2w$	$l = 427,\ w = 393$	P 1640
16) $B = 180 - (A + C)$	$A = 75,\ C = 48$	B 57
17) $l = a + (n-1)d$	$a = 6,\ n = 12,\ d = 5$	l 61
18) $I = \frac{E}{R}$	$E = 220,\ R = 11$	I 20
19) $P = \frac{Fd}{t}$	$F = 90,\ d = 10,\ t = 3$	P 300
20) $C = \frac{5}{9}(F-32)$	$F = -22$	C -30

Solve each of the following for the "Unknown" variable.

A

	Formula	Known Variables	Unknown Variable
21)	$p = 3s$	$p = 18$	s 6
22)	$d = 2r$	$d = 56$	r 28
23)	$A = lw$	$A = 96, l = 6$	w 16
24)	$c = \pi d$	$c = 15.7, \pi = 3.14$	d 5
25)	$i = prt$	$i = 140, p = 400, r = .05$	t 7
26)	$V = \pi r^2 h$	$V = 6{,}280, \pi = 3.14, r = 10$	h 20
27)	$A = bh$	$A = 72, h = 18$	b 4
28)	$A = lw$	$A = 777, w = 21$	l 37
29)	$i = prt$	$i = 108, r = 4\%, t = 9$	P 300
30)	$V = lwh$	$V = 1{,}536, l = 16, h = 12$	w 8
31)	$A = 2\pi rh$	$A = 660, \pi = \frac{22}{7}, h = 21$	r 5
32)	$A = p + i$	$A = 428, i = 43$	P $9\frac{41}{43}$
33)	$p = b + 2e$	$p = 91$ and $e = 29$	b 33
34)	$C = A - 273$	$C = 42$	A 315
35)	$L = A - C$	$L = 3{,}500, C = 9{,}300$	A 12800
36)	$P = 2l + 2w$	$p = 162, w = 34$	l 47
37)	$P = 2l + 2w$	$P = 266, l = 81$	w 52
38)	$v = V + gt$	$v = 323, g = 32, t = 9$	V 35

C Solve each of the following for the "Unknown" variable.

	Formula	Known Variables	Unknown Variable
39)	$d = \frac{c}{\pi}$	$d = 15$, $\pi = 3.14$	c 47.1
40)	$V = \frac{Bh}{3}$	$V \geq 56$, $B = 24$	h 7
41)	$A = \frac{ab}{2}$	$A = 144$, $b = 18$	a 16
42)	$A = \pi dh + \frac{1}{2}\pi d^2$	$A = 572$, $\pi = \frac{22}{7}$, $d = 14$	h 6
43)	$A = p \div Prt$	$A = 640$, $p = 500$, $t = 7$	r $\frac{4}{25}$
44)	$PV = P^1 V^1$	$P = 75$, $V^1 = 38$, $P^1 = 25$	V $12\frac{2}{3}$

Artisans

Colonial National

Wilmington Trust

First National

Delaware Trust

Wilmington Savings

Commercial Trust

Farmers

Bank of Delaware

Peoples

BANKING

UNIT III

Banks are familiar to all of us, but we would like to become more familiar. This section of work gives us this opportunity.

Many banks publish books to describe the value of the bank to the community. Maybe we could obtain one and bring it to class.

Maybe we could get a man from the bank to speak to us.

Maybe we could talk about some personal or family dealings with the bank.

Maybe we could talk about your needs to be hired to work in a bank.

Let's keep our eyes and ears open for all bank problems during this unit.

DO YOU REMEMBER?

1) Do the indicated operations:

a) $13.76 + 9.48 = \$23.24

b) $3007.29 + 647.38 = \$3654.67

c) $15.76 - 3.79 = \$11.97

d) $3005.72 - 7.69 = \$2998.03

e) $300.65 x .05 = \$15.0325

f) $240 x .075 = \$18.000

g) .06) 72 = 1200

h) .08) 13.84 = 173

2) Using the formula I = prt

a) p = $60, r = .06, t = 2, find I \$7.20

b) I = $50, p = $2000, r = .05, find t $\frac{1}{2}$ yr.

3) Change to **fractions**

a) 18 months = $1\frac{1}{2}$ years

b) 3 months = $\frac{1}{4}$ year

c) 90 days = $\frac{1}{4}$ year

4) Take today's date (month, day, year)

a) What date is 30 days from now? count each calendar day

b) What date is 1 month from now? same day, one month later

c) What date is 1 year from now? same month, same day, one year later

5) If you pay $1.00 for $100 worth of travelers checks, then you pay

a) $ \$7 for $700 worth of travelers checks.

b) $ \$10 for $1000 worth of travelers checks.

6) Write as a fraction

a) 50 ¢ = $ $\frac{50}{100}$

b) 5 ¢ = $ $\frac{5}{100}$

c) no cents = $ $\frac{0}{100}$ or $\frac{00}{100}$

POOR ORIGINAL COPY - BEST
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LET'S GET SOME PRACTICE

1) Do indicated operations

a) \$27.36 + 9.48 = \$36.84

b) \$3029.27 + 412.75 = \$3442.02

c) \$16.06 - 3.79 = \$12.27

d) \$4129.73 - 59.76 = \$4069.97

e) \$419.72 x .055 = \$23.08460

f) \$336 x .065 = \$21.840

g) .07)15.05 = 215

h) .065)13.85 = 213.07

2) Using formula I = prt

a) p = \$40, n = .065, t = $1\frac{1}{2}$ find I \$3.90

b) I = \$63, p = \$1500, r = .042, find t 1 yr

3) Change to fractions

a) 15 months = $1\frac{1}{4}$ years

b) 4 months = $\frac{1}{3}$ years

c) 270 days = $\frac{3}{4}$ years

4) Take the date - Aug. 5, 1969

a) What date is 30 days from above date Sept. 4, 1969

b) What date is 3 months from above date Nov. 5, 1969

c) What date is 1 year from above date Aug 5, 1970

5) If you pay \$1.00 for \$100 worth of travelers checks, then you pay

a) \$ \$4 for \$400 dollars worth of travelers checks

b) \$ \$7.50 for \$750 dollars worth of travelers checks

6) Write as fractions

a) 75¢ = \$ $\frac{75}{100}$

b) 90¢ = \$ $\frac{90}{100}$

c) 65¢ = \$ $\frac{65}{100}$

POOR ORIGINAL COPY - BEST
AVAILABLE AT TIME FILMED

LET'S GET SOME PRACTICE

1) Do the indicated operations

a) $351.76 + 48.94 = $400.70

b) $4172.79 + 867.58 = $5040.37

c) $39.06 - .87 = $38.19

d) $5000.14 - 4.89 = $4995.25

e) $522.71 x .062 = $32.40802

f) $336 x .407 = $136.752

g) .023)3.059 = 133

h) .056)11.816 = 211

2) Using formula I = prt

a) p = $505, r = 4%, t = $2\frac{1}{4}$ find I $45.45

b) I = $80, p = $2000, t = $\frac{1}{2}$, find r $\frac{80}{1000}$ or 8%

3) Change to fractions

a) 16 months = $1\frac{1}{3}$ years

b) 10 months = $\frac{5}{6}$ years

c) 150 days = $\frac{5}{12}$ years

4) Take the date (Feb. 17, 1969 not a leap year)

a) What date is 30 days from the above date? Mar. 19, 1969

b) What date is 3 months from the above date? May 17, 1969

c) What date is 1 year from the above date? Feb 17, 1970

5) If you pay $1.00 for $100 worth of travelers checks then you pay

a) $6.50 for $650 dollars worth of travelers checks,

b) $5.65 for $565 dollars worth of travelers checks

6) Write as fraction

a) 45¢ = $ $\frac{45}{100}$

b) 6¢ = $ $\frac{6}{100}$

c) 95¢ = $ [illegible]

Let's Check Our Banking Vocabulary

Deposit slip
Withdrawal slip
Check
Check register (or stub)
Face of a check (or note)
Bank statement
Service Charge
Balance
Endorsing
Checking Account
Saving's Account
Travelers Checks
Notes (loans)
Date of Maturity
Maker
Collateral
Interest
Interest Simple
Interest Compound
Principal
Rate
Time
Amount
Bank Discount

We shall go over these now. As you go through this section on banking try to remember these words. We will check later to see how many you learned.

BANKING

In our community we have many banks. Can you name a few? What are the main purposes of these banks?

Generally, banks have three main purposes;

1) keeping money safe for people - (savings accounts)
2) making it easy for people to move their money around - (checking accounts)
3) helping people in times of financial needs - (loans).

We shall study all three phases.

CHECKING ACCOUNTS

Most of us will use checks during our lifetime. Checks are used by individuals as well as businesses and the governments. Let us look into the way the individual is involved in opening and using a checking account.

The individual must first fill in a signature card as in the example. This will be signed exactly as all future checks will be signed.

SINGLE ACCOUNT No:

I hereby agree to the By-Laws, Rules and Regulations of the ARTISANS' SAVINGS BANK

MR. ☐
MRS. ☐
MISS ☐
DR. ☐

SIGNATURE: [redacted]

ADDRESS:

OCCUPATION: **EMPLOYER:**

NEXT OF KIN:

SOCIAL SECURITY NBR:

DATE OPENED: **INITIAL DEPOSIT:** **TELLER:**

Duplicates available

In order for the person to have money in his account he must fill out a deposit slip as shown in the form. The slip is then given to the bank clerk (teller) with the total deposit.

BA-5 **DEPOSIT TICKET**

BANK OF DELAWARE

INSURED BY FEDERAL DEPOSIT INSURANCE CORPORATION

DEPOSITED BY

NAME ____________________

ADDRESS ____________________

DATE ____________________

FOR CREDIT TO ACCOUNT OF

☐	▨	☐	☐	☐	☐	☐	☐

ALL CHECKS AND DRAFTS CREDITED SUBJECT TO FINAL VERIFICATION AND PAYMENT

⑆0311⑉0008⑆

		DOLLARS	CENTS
CURRENCY			
COINS			
CHECKS	BANK NUMBER		
LIST SEPARATELY AND BE SURE EACH ITEM IS ENDORSED			
TOTAL			

– 0311 – 008 is the bank number
Students should make up number to put
Use this in their problem

The teller will return to you a receipt for the amount deposited, plus a check book. You will enter the initial deposit in the check register, as shown. Any future deposits will be added to the check register. Any withdrawals by check will be subtracted from the check register. Balances after deposits or withdrawals should always be checked for accuracy.

CHECK REGISTER

CHECK NO.	DATE	CHECK ISSUED TO	AMOUNT OF CHECK	✓	DATE OF DEP.	AMOUNT OF DEPOSIT	BALANCE

DEPOSIT SLIP

SA-5 **DEPOSIT TICKET**

BANK OF DELAWARE

INSURED BY FEDERAL DEPOSIT INSURANCE CORPORATION

DEPOSITED BY

NAME ______________________________

ADDRESS ______________________________

DATE ______________________________

FOR CREDIT TO ACCOUNT OF

☐ ☐ ▨ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

ALL CHECKS AND DRAFTS CREDITED SUBJECT TO FINAL VERIFICATION AND PAYMENT

⑆0311⑈0008⑆

		DOLLARS	CENTS
CURRENCY			
COINS			
CHECKS			
LIST SEPARATELY AND BE SURE EACH ITEM IS ENDORSED			
TOTAL			

SA-5 **DEPOSIT TICKET**

BANK OF DELAWARE

INSURED BY FEDERAL DEPOSIT INSURANCE CORPORATION

DEPOSITED BY

NAME ______________________________

ADDRESS ______________________________

DATE ______________________________

FOR CREDIT TO ACCOUNT OF

☐ ☐ ▨ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

ALL CHECKS AND DRAFTS CREDITED SUBJECT TO FINAL VERIFICATION AND PAYMENT

⑆0311⑈0008⑆

		DOLLARS	CENTS
CURRENCY			
COINS			
CHECKS			
LIST SEPARATELY AND BE SURE EACH ITEM IS ENDORSED			
TOTAL			

SA-5 **DEPOSIT TICKET**

BANK OF DELAWARE

INSURED BY FEDERAL DEPOSIT INSURANCE CORPORATION

DEPOSITED BY

NAME ______________________________

ADDRESS ______________________________

DATE ______________________________

FOR CREDIT TO ACCOUNT OF

☐ ☐ ▨ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

ALL CHECKS AND DRAFTS CREDITED SUBJECT TO FINAL VERIFICATION AND PAYMENT

⑆0311⑈0008⑆

		DOLLARS	CENTS
CURRENCY			
COINS			
CHECKS			
LIST SEPARATELY AND BE SURE EACH ITEM IS ENDORSED			
TOTAL			

127 Ditto 1

CHECK REGISTER

CHECK NO.	DATE	CHECK ISSUED TO	AMOUNT OF CHECK	✓	DATE OF DEP.	AMOUNT OF DEPOSIT	BALANCE

CHECK NO	DATE	CHECK ISSUED TO	AMOUNT OF CHECK	✓	DATE OF DEP.	AMOUNT OF DEPOSIT	BALANCE

CHECK NO.	DATE	CHECK ISSUED TO	AMOUNT OF CHECK	✓	DATE OF DEP.	AMOUNT OF DEPOSIT	BALANCE

127 Ditto 2

A 1) Make out the following deposit

a) deposit on Sept. 1, 1969

six one dollar bills and two dollars, fifty four cents in coins.

#6.00
2.50
#8.50

B 2) Make out the following deposit

a) deposited on Nov. 2, 1969

2 checks (5 - 724) for twenty five dollars, and (3 - 472) for six dollars, seventy five cents.

3 - ten dollar bills and four one dollar bills.

2 quarters, and 3 dimes.

#31.75
34.
.80
#66.55

C 3) Make the following deposit slips

a) deposited December 5, 1969

3 checks - (7 - 3045) for fifty dollars and fifty cents, (9 - 4026) for seventy-two dollars and nineteen cents, and (2 - 467) for twenty seven dollars and eight cents.

4- twenty dollar bills, 3- ten dollar bills, and 2- five dollar bills.

5- half dollars, 3 quarters, 2 dimes, 4 nickels, and 5 pennies.

149.77
120
3.70
273.47

1) Make out the following deposit

a) deposit on September 5, 1969

fifteen dollar bills and three dollars and thirteen cents in coins.

#15.00
3.13
#18.13

2) Make out the following deposit

a) deposit on November 8, 1969

2 checks - (3 - 104) for seven dollars and fifty cents. and (6 - 4027) for eight dollars.

2- twenty dollar bills and 3- five dollar bills.

4 quarters, 2 dimes, and 1 nickel.

#15.50
55
1.25
#71.75

C 3) Make out the following deposit slip.

a) deposited December 7, 1969

3 checks - (2 - 521) for three dollars and seven cents, (4 - 3210) for thirty seven dollars and seventeen cents, and (2 - 416) for two hundred forty dollars and fifty eight cents.

2- hundred dollar bills, 1- twenty dollar bill, 3- ten dollar bills, 2- five dollar bills, and 12- one dollar bills.

3- half dollars, 5- quarters, 4- dimes, 12- nickels and 8 pennies.

#280.82
272.—
3.83
#556.65

1) Make out the following deposit.

a) deposit on September 9, 1969

forty five dollars in currency and five dollars and twenty seven cents in coins.

$45.00
5.27
$50.27

2) Make out the following deposit.

a) deposit on November 8, 1969

2 checks - (3 - 1274) for thirty seven dollars, and (4 - 729) for eight dollars and eighty four cents.

4 ten dollar bills and 2 five dollar bills.

3 quarters and 13 pennies.

$45.84
50.00
.88
$96.72

C 3) Make the following deposit slips.

a) deposited December 9, 1969

4 checks - (3 - 609) for forty dollars, (3 - 1742) for twenty eight dollars and eighteen cents, (2 - 476) for eighteen dollars and seventy six cents, and (4 - 307) for fifty five dollars and thirty six cents.

1- hundred dollar bill, 3- twenty dollar bills, 6- ten dollar bills, 3- five dollar bills, and 14- one dollar bills.

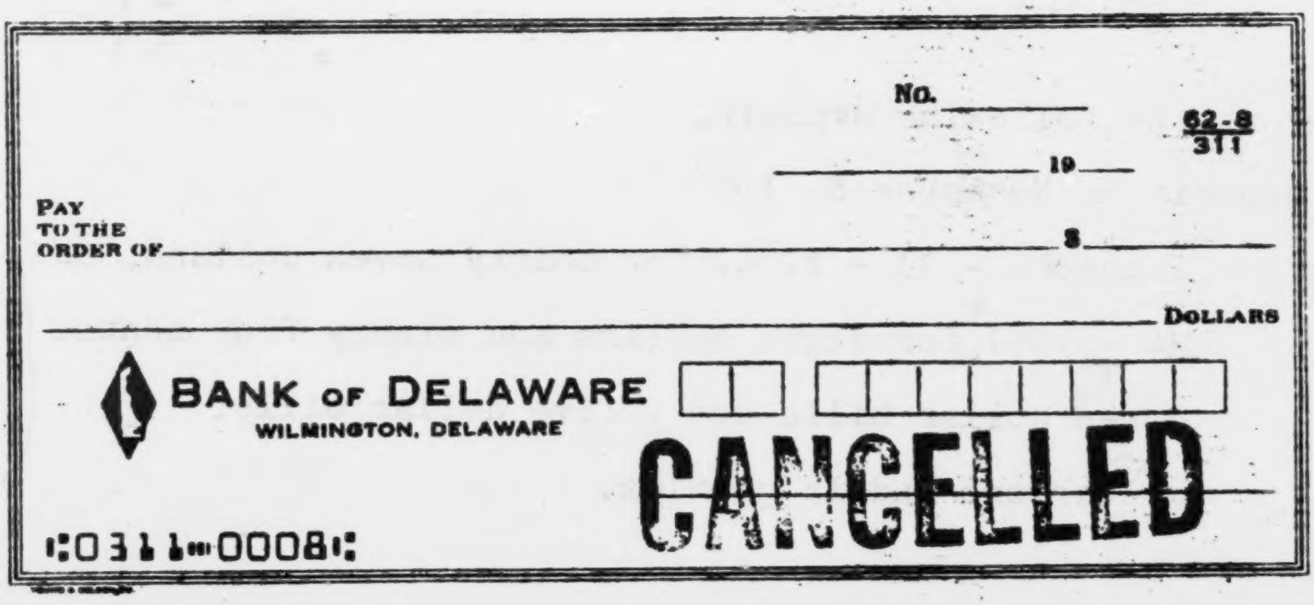
7- half dollars, 3- quarters, 11- dimes, 21- nickels, 37- pennies.

$142.30
249.00
6.77
$398.07

POOR ORIGINAL COPY - BEST AVAILABLE AT TIME FILMED

Duplicate Available

A withdrawal (taking money out of the bank) is simply done by filling in the proper information on the check example and signing your name as it was signed on your signature card.



No. ______ $\frac{62\text{-}8}{311}$

______ 19___

PAY TO THE ORDER OF ______ $ ______

______ DOLLARS

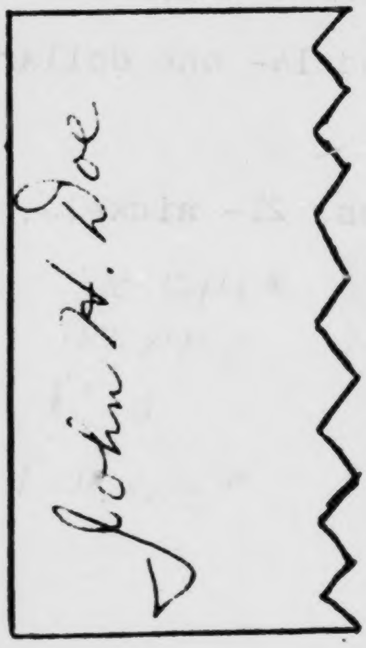
BANK OF DELAWARE
WILMINGTON, DELAWARE

CANCELLED

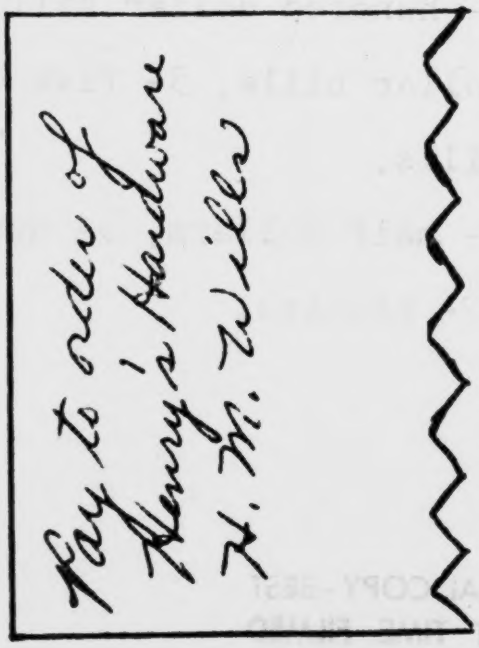
⑆0311⑉0008⑆

A check that is not made out by you, but is to be paid to you by another person should be endorsed on the back exactly as your name is on the front, then passed on to whomever you want to give the money.

The two main types of endorsements are a blank endorsement, and a restrictive endorsement as shown in the examples.



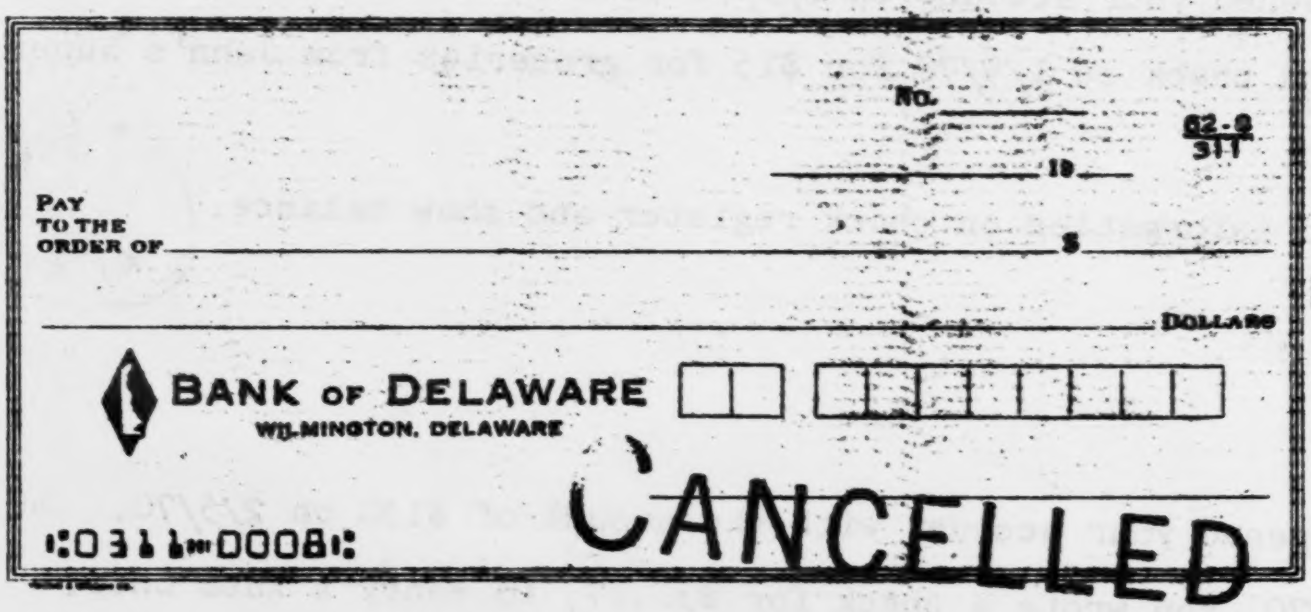
John H. Doe



Pay to order of
Henry's Hardware
H. M. Willes

131

CHECKS



No. ________

62-8
311

____________ 19___

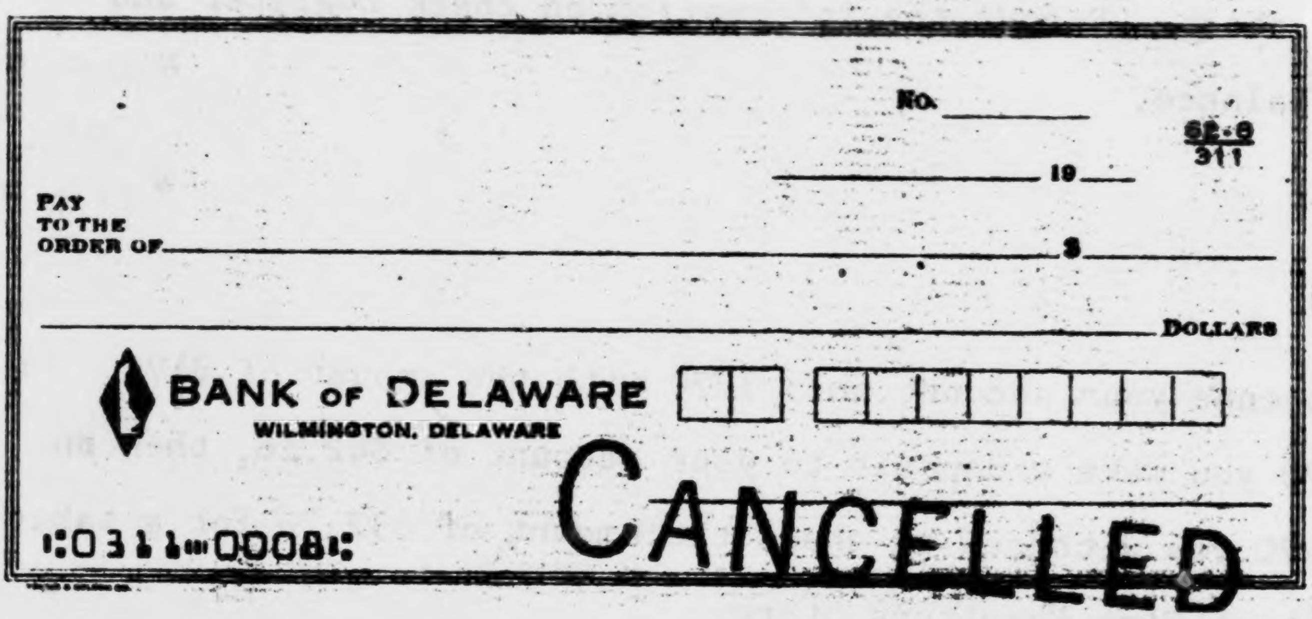
PAY TO THE ORDER OF ____________________ $ ______

______________________________ DOLLARS

BANK OF DELAWARE
WILMINGTON, DELAWARE

CANCELLED

⑆0311⑉0008⑆



No. ________

62-8
311

____________ 19___

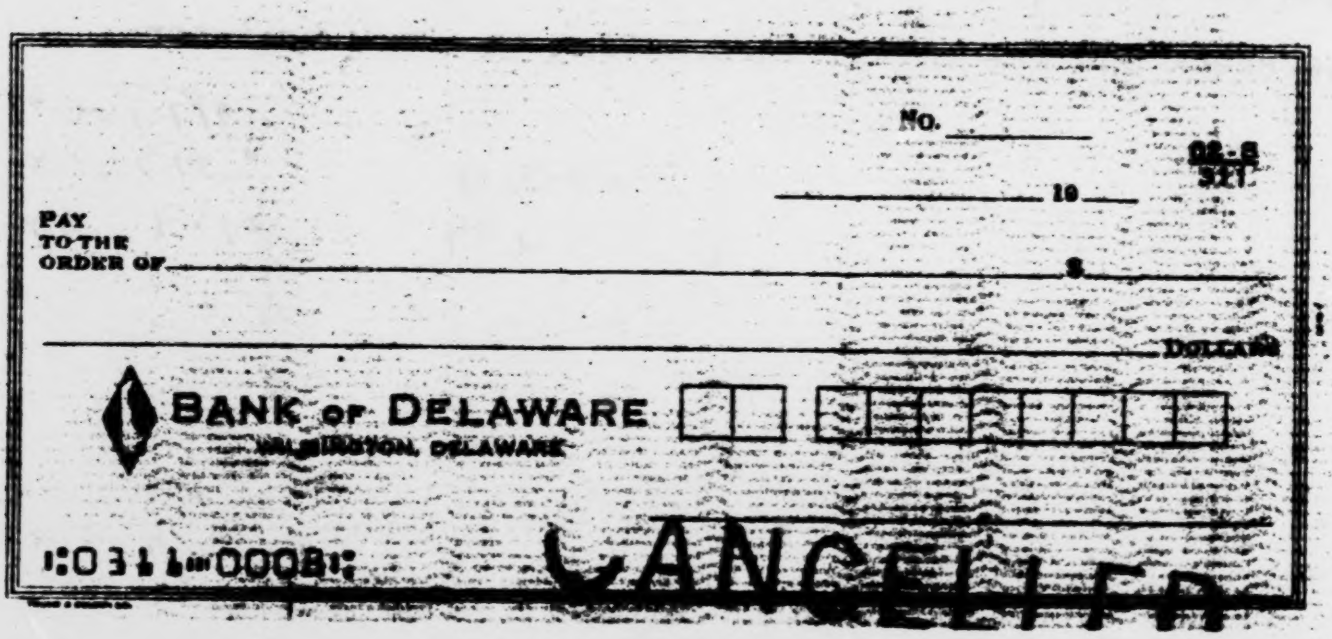
PAY TO THE ORDER OF ____________________ $ ______

______________________________ DOLLARS

BANK OF DELAWARE
WILMINGTON, DELAWARE

CANCELLED

⑆0311⑉0008⑆



No. ________

62-8
311

____________ 19___

PAY TO THE ORDER OF ____________________ $ ______

______________________________ DOLLARS

BANK OF DELAWARE
WILMINGTON, DELAWARE

CANCELLED

⑆0311⑉0008⑆

131D ithe

A 1) You opened your account on 1/3/70 with the amount of $200. Write a check on 1/9/70 for $15 for groceries from John's Super Market.

Record information on check register and show balance.

$200.00
15.00
$185.00

B 2) You opened your account with the amount of $150 on 2/5/70. On 2/10/70 you wrote a check for $30.17, to Henry's Auto Shop. Write check. Record the information on check register and show balance.

$150.00
- 30.17
$119.83

C 3) You opened your account on 3/3/70 with the amount of $175. On 3/8/70 you make a deposit to your account of $42.18, then on 3/12/70 you withdrew by check the amount of $32.79 for a table bought at Fine Furniture Store.

Write check and record all information on check register.

$175.00
+ 42.18 $217.18
- 32.79 $184.39

1) You put $75 into an account on 1/11/70. On the thirteenth of January 1970, you wrote a check for $28 to Joe's Sporting Goods Store for a set of golf clubs.

Write the check and all the information on the check register.

$75.00

-$28.00 $47.00

2) You put $60 into your checking account on 2/12/70. A check for $8.72 was written on 2/14/69 to Mr. James Hanson for repairing a glass window.

Write the check and record all the information on the check register.

$60.00

-$8.72 $51.28

C 3) You open an account with $95 on 3/13/70. On March the fifteent you write a check to your TV repair man, Harry Jones, in the amount of $8.59. However, the day before you had deposited $15. Write the check and all the information on the check register.

$95.00

-$8.59 $86.41

A 1) You have $125.70 in your checking account on 4/15/70. On April 17, 1970 you write a check #14 to John Hanson in the amount of $5 for garage rental.

4c

#125.70
- 120.70

B 2) On April the thirteenth you make a deposit of $75. You send a check on April 18th for a ticket to a ballgame, to the Phila. Athletic Assoc., costing $3.50.

+#75
- 3.50

#195.70
#192.20

C 3) On May 1 a friend of yours pays you money he owes you in the amount of $5.75. You immediately deposit this in your account. The next day in town you see a fishing rod in Bills Boat Shop and you purchase it for $10.89.

+#5.75
-10.89

#197.95
#187.06

After these transactions (deposits and withdrawals) what is your final checking account balance.

John received a check for $10 from an uncle in Pittsburgh, Pa. John's father said he would take John to the bank to get the check cashed. The check was made out to J. H. Mays.

1) Was it necessary for John's father to go to the bank with him? no.

2) Bankers will not cash a check for a stranger unless he can identify himself (prove that he is the payee of the check). In what ways may a person identify himself? soc. sec. card, drivers lic, credit cards

3) Where should John endorse the check? back

4) How would he make a blank endorsement? J. H. Mays

5) What is a disadvantage of a blank endorsement? anyone may cash it.

John Davis wrote a check to B. M. Stack. The check was later transferred to Ernest White.

6) Show the endorsement which was probable on the check.

B. M. Stack

Bills Hardware Store received a check from Larry Mills.

7) Show a restrictive endorsement which might be on the check.

For payment of grocery bill. Larry Mills

Bill Miller of your town wrote a check on Delaware Bank to J. Bye in Milliville, Md. J. Bye cashed the check at the City Bank of Maryland.

8) Show Mr. Bye's endorsement. J. Bye

9) Will the City Bank of Maryland endorse the check? yes

10) What will the Delaware Bank do with the check? Returns as cancelled check to Bill Miller.

At the end of a period of time (usually once a month or once every three months) the bank will send you a statement as shown. The statement will show all deposits, withdrawals, or service charges for that period of time. A service charge may be a charge for letting your check account balance go below a minimum amount which has previously been set by the bank, or for writing a check with insufficient funds in the bank.

In the example the top of the form shows the number and total of all transactions during the month of April and the balance in your account at the end of the month.

The lower part of the bank statement shows the individual daily deposits and withdrawals. Note the transactions on 4/12/70. There were two withdrawals in the same day. The total of these two were taken from the balance for that day.

Sometimes there will be a difference in the balance which the bank shows and your check register balance. A bank will not deduct the amount of a check until they have received it while you will deduct it from your check register immediately when you write it. So it is always advisable to check the statement against your register each month.

BANK STATEMENT

DATE OF LAST STATEMENT	AMOUNT OF LAST STATEMENT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3/31/70	$200.00	2	$75.00	5	$54.38	.50

ACCOUNT NO.

BALANCE AS OF

April 30, 70

$220.12

CHECKS AND OTHER DEBITS	CHECKS AND OTHER DEBITS	[illegible]	[illegible]	BALANCE
Balance	on hand		4/1/70	200.00
		50.00	4/2/70	250.00
7.50			4/5/70	242.50
4.38	2.63		4/12/70	235.49
		25.00	4/26/70	260.49
36.87			4/27/70	223.62
3.00			4/28/70	220.62
.50 j			4/30/70	220.12

[illegible]

BANK OF DELAWARE

VERIFIED

BANK STATEMENT

DATE OF LAST STATEMENT	AMOUNT OF LAST STATEMENT	NO. OF CREDITS			

ACCOUNT NO.

BALANCE AS OF

CHECKS AND OTHER DEBITS	CHECKS AND OTHER DEBITS			BALANCE

DATE OF LAST STATEMENT	AMOUNT OF LAST STATEMENT	NO. OF CREDITS	AMOUNT OF CREDITS		AMOUNT OF DEBITS	SERVICE CHARGE

ACCOUNT NO.

BALANCE AS OF

CHECKS AND OTHER DEBITS	CHECKS AND OTHER DEBITS		DATE	BALANCE

137D

Use the forms provided and make a monthly statement for the following deposits and withdrawals.

A 1) In the month of May you start with a balance of $340. During the month you have these withdrawals: May 4 - $40.00, May 9 - $60.00 and May 26 - $8.00. There was one deposit during the month. On May 12 you deposited $24.00.

(Final bal - $256)

B 2) Your bank statement in June starts with a balance of $80. On June 8 and 22 respectively, you deposit amounts of $18 and $32. In the same month of June you withdraw by writing checks the amounts of $16.05 on June 7, $15.16 on June 12, and $39.40 on June 20.

(Final bal - $59.49)

C 3) The bank balance at the beginning of October was $130.26. You withdrew on October 2 - $70.40, October 14 - $8.13, October 20 - $16.40, October 21 - $8.49 and October 30 - $39.12. You deposited on October 9 - $30.42 and October 22 - $8.64

(Final bal $26.78)

Use the forms provided and make a monthly statement for the following deposits and withdrawals.

A 1) Your balance in your checking account at the end of January was $180. In February you had a deposit of $20.00 on February 9. The three withdrawals for February were $3.00 and February 5, $8.00 and February 16, and $17.00 on February 20.

Bal Feb 28 $172.00

B 2) Starting with $340 on the 1st of June, what would be your statement at the end of the month if you had withdrawals of $13.15 on June 5, $87.93 on June 9, and $113.28 on June 20. You did make a deposit of $15.12 on June 12.

Bal June 30 $140.76

C 3) The month of December had many bills. Your balance left over from November 30 was $315. You wrote and the bank paid checks on December 5 for $27, December 8 for $80, December 15 for $87.24, and December 19 for $8.36. If your bank balance goes below $200 the bank charges you a service charge of $.50. Show monthly statement.

Bal Dec 31 $111.90

Make parts 1, 2, and 3 continuous statements for May, June, and July.

A Starting on May 1 you have a balance of $210. During this month you made on deposit of $75 on May 5. There were three withdrawals of $13.00 on May 2, $45.00 on May 16, and $30 on May 25.

May 31 Bal $197

B You start with the balance from Mays statements and have debits (withdrawals) of $17.00 on June 5, $8.32 on June 8, $17.32 on June 20 and $10.04 on June 22. One deposit of $100 is made on June 15.

June 30 Bal $244.32

C Make statement for July with these withdrawals (debits) and these deposits (credits) (Note the dates and put in order)

Debits	Credits
July 6 - $8.40	July 17 - $20.50
July 15 - $32.70	July 20 - $68.42
July 4 - $2.13	
July 25 - $4.72	
July 17 - $18.07	

Final bal July 31 $267.22

SAVING ACCOUNTS

The savings account, as its name indicates, is a method of savings or keeping money on hand for an emergency or for your convenience.

Three main differences between the savings account and the checking accounts are:

1) the savings account draws interest while generally, the checking account does not.
2) the savings account limits the amount of money which can be withdrawn at one time, usually without previously having notified the bank of your intentions.
3) the savings account has a passbook in which the bank records all transactions, while in the checking account you keep your own record on the check stubs.

To open a savings account, you are again required to fill in a signature card.

Deposit slips are similar to those used for the checking accounts. Withdrawal slips, as shown, are necessary to get money out of the bank. Also, you will have a passbook as shown, which has to be presented with the deposit or withdrawal slip. The teller will then make the proper entry in it.

Duplicate available

WITHDRAWAL SLIP

WITHDRAWN FROM

ARTISANS' SAVINGS BANK

WILMINGTON, DELAWARE

DATE: ______________ ACCT. NO. ______________

ACCT. TITLE: ______________

____

AMOUNT OF WITHDRAWAL: $ ______________
(FIGURES)

______________ DOLLARS
(WRITE AMOUNT OF WITHDRAWAL)

AND CHARGE TO ACCOUNT OF:

SIGNATURE: ______________

____

PAYMENT BY:

CASH ☐, CHECK # ______________, TRANSFER TO A/C ______________

PAY TO: ______________

WITNESS TO ABOVE SIGNATURE(S):

____

TOTAL WITHDRAWAL: $

Passbook Must Be Presented With Each Transaction

Old Address: ______________

New Address: ______________

CHANGE OF ADDRESS

142

WITHDRAWAL SLIP

WITHDRAWN FROM

ARTISANS' SAVINGS BANK

WILMINGTON, DELAWARE

DATE: ______________________ ACCT. NO.: ______________________

ACCT. TITLE: ______________________

____

AMOUNT OF WITHDRAWAL: $ ______________________
(FIGURES)

______________________ DOLLARS
(WRITE AMOUNT OF WITHDRAWAL)

AND CHARGE TO ACCOUNT OF:

SIGNATURE: ______________________

____

PAYMENT BY:

CASH ☐; CHECK $ ______________________; TRANSFER TO A/C ______________________

PAY TO: ______________________

WITNESS TO ABOVE SIGNATURE(S):

____

TOTAL WITHDRAWAL: $

Passbook Must Be Presented With Each Transaction

Old Address:

New Address:

CHANGE OF ADDRESS

142D

Duplicate
available

DEPOSIT SLIP.

DEPOSITED IN

ARTISANS' SAVINGS BANK

WILMINGTON, DELAWARE

DATE: ______________________ **ACCT. NO.:** ______________________

ACCT. TITLE: ______________________

____

PLEASE SEE THAT ALL CHECKS ARE PROPERLY ENDORSED

DEPOSITS OTHER THAN CASH ARE CREDITED SUBJECT TO FINAL PAYMENT IN CASH

	Dollars	Cents
CURRENCY		
COIN		
P. O. MONEY ORDERS		
CHECKS (List Each Separately)		
TOTAL:		

Passbook Must Be Presented With Each Transaction

CHANGE OF ADDRESS

Old Address: ______________________

New Address: ______________________

DEPOSIT SLIP

DEPOSITED IN

ARTISANS' SAVINGS BANK

WILMINGTON, DELAWARE

DATE: ________________ ACCT. NO.: ________________

ACCT. TITLE: ________________________________

PLEASE SEE THAT ALL CHECKS ARE PROPERLY ENDORSED

DEPOSITS OTHER THAN CASH ARE CREDITED SUBJECT TO FINAL PAYMENT IN CASH

	Dollars	Cents
CURRENCY		
COIN		
P. O. MONEY ORDERS		
CHECKS (List Each Separately)		
TOTAL:		

Passbook Must Be Presented With Each Transaction

CHANGE OF ADDRESS

New Address: ________________

Old Address: ________________

143 Dillo

Duplicate available

DEPOSIT BOOK

DEPOSITOR'S NAME ON PAGE ONE

	DATE	WITHDRAWAL	DEPOSIT	DIVIDEND	BALANCE	TRANS.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						

PLEASE INFORM US OF ANY
CHANGE OF ADDRESS

ARTISANS' SAVINGS BANK
WILMINGTON, DELAWARE

144

PASSBOOK

DEPOSITOR'S NAME ON PAGE ONE

	DATE	WITHDRAWAL	DEPOSIT	DIVIDEND	BALANCE	TRANS.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						

DEPOSITOR'S NAME ON PAGE ONE

	DATE	WITHDRAWAL	DEPOSIT	DIVIDEND	BALANCE	TRANS.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						

DEPOSITOR'S NAME ON PAGE ONE

	DATE	WITHDRAWAL	DEPOSIT	DIVIDEND	BALANCE	TRANS
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						

144Dolla

A 1) Show passbook entries starting with balance of $120. Record in passbook a deposit on May 6 of $30.00. Then fill a withdrawal slip dated May 12 for $10.00 and record this transaction in the passbook.

(Last bal $140)

B 2) Start in your passbook with a balance of $180 as of April 1, 1970. The dividend (interest) received for the first three months of the year is $1.80. Enter dividend in passbook. Three deposits are made on April 5 for $8.00, April 16 for $17.32, and April 20 for $10.04. On April 14 you make a withdrawal of $30.47. Make out a withdrawal slip for this amount and make all entries in the passbook.

(Last bal $186.69)

C 3) In July, your passbook starts with a balance of $240. You immediately enter your dividend (interest) on this balance, if the bank gives 4% compounded quarterly. On the 5th of July you deposit $12.00. On the 16th of July you make a withdrawal of $8.32. Make out a withdrawal slip and all entries in the passbook.

(Last bal $246.08)

A 1) Show passbook entries starting with balance of $3.00. Record in passbook a deposit of $12.00 on June 5. Then fill in a withdrawal slip dated June 15 for $8.00 and record the transactions in the passbook.

(Last bal $7)

B 2) Start your passbook for August with a balance of $187.64. Dividends (interest) is to be added to your account on August 6 for $ .93. Two deposits are made of August 7 and August 10 for $9.00 and $15.76 respectively. On August 14 you withdraw $9.42. Make the withdrawal slip and all entries in the passbook.

(Last bal #203 91)

C 3) October 1 the bank figures your quarterly interest at 4% compounded quarterly on your balance of $300 and makes a prompt entry of this amount in the passbook. You then withdraw $11.96 on October 6. Make the withdrawal slip and proper entry in the passbook. Two deposits in the amounts of $30.00 and $45.16 are made on the 16th and 18th of October respectively. Make all proper entries in your passbook.

(Last bal #366.20)

LET'S TRY THESE

A 1) 25% means $\frac{?}{100}$ 25

2) 65% means $\frac{?}{100}$ 65

3) 32% means $\frac{?}{100}$ 32

4) 4.5% means $\frac{?}{100}$ 4.5

5) .16 means ___?___ fraction $\frac{16}{100}$

6) .25 means ___?___ fraction $\frac{25}{100}$

7) .04 means ___?___ fraction $\frac{4}{100}$

8) .32 is ___?___ percent 32%

9) .07 is ___?___ percent 7%

10) .94 is ___?___ percent 94%

11) $\frac{5}{20} = \frac{?}{100}$ 25

12) $\frac{3}{4} = \frac{?}{100}$ 75

13) $\frac{3}{8} = \frac{?}{100}$ 37.5

14) 5% of 100 is ___?___ 5

15) 1% of 316.2 is ___?___ 3.162

16) 8% of 64 is ___?___ 5.12

17) .25% = ___?___ decimal .0025

18) $\frac{1}{4}$% = ___?___ decimal .0025

19) $\frac{1}{2}$% = ___?___ decimal .005

20) $\frac{3}{4}$% = ___?___ decimal .0075

21) 5 $\frac{1}{2}$% = ___?___ decimal .055

22) 5 $\frac{1}{2}$% of 90 is ___?___ 495

23) 4 $\frac{3}{4}$% of 60 is ___?___ 28.5

24) 6 $\frac{1}{4}$% of 80 is ___?___ 5

25) What % of 24 is 6 ___?___ 25

26) 7 is what % of 28 ___?___ 25

27) What % of 90 if 9 ___?___ 10

28) 8 is what % of 26 ___?___ 31

LET'S TRY AGAIN?

1) 50% means ___?___ fraction $\frac{50}{100}$

2) .03 is ___?___ percent 3%

3) .21 is ___?___ percent 21%

4) 16% means ___?___ fraction $\frac{16}{100}$

5) .02 means ___?___ fraction $\frac{2}{100}$

6) 12% means ___?___ fraction $\frac{12}{100}$

7) $\frac{5}{8} = \frac{?}{100}$ 62.5

8) $\frac{5}{10} = \frac{?}{100}$ 50

9) $\frac{5}{20} = \frac{?}{100}$ 25

10) .05 means ___?___ fraction $\frac{.05}{100}$ or $\frac{5}{10000}$

11) 21% is ___?___ fraction $\frac{21}{100}$

12) $\frac{3}{5} = \frac{?}{100}$ 60

13) 10% of 100 is ___?___ 10

14) 23% of 60 is ___?___ 13.8

15) 9% of 36 is ___?___ 3.24

16) $\frac{1}{4}\%$ = ___?___ decimal .0025

17) $\frac{1}{5}\%$ = ___?___ decimal .002

18) .5% = ___?___ decimal .005

19) $3\frac{2}{5}\%$ of 30 = ___?___ 1.02

20) $6\frac{1}{2}\%$ of 90 = ___?___ 5.85

21) $5\frac{1}{4}\%$ of 20 = ___?___ 1.05

22) What % of 50 is 5? 10%

23) What % of 20 is 5? 25%

24) What % of 12 is 3? 25%

25) 9 is what percent of 18? 50%

LET'S TRY AGAIN

1) 29% means ___?___ fraction $\frac{29}{100}$

2) .04 is ___?___ percent 4%

3) .04 is ___?___ fraction $\frac{4}{100}$

4) $\frac{4}{25} = \frac{?}{100}$ 16

5) $\frac{3}{10} = \frac{?}{100}$ 30

6) $\frac{6}{20} = \frac{?}{100}$ 30

7) $\frac{3}{50} = \frac{?}{100}$ 6

8) 93% is ___?___ fraction $\frac{93}{100}$

9) 16 % is ___?___ fraction $\frac{16}{100}$

10) 49 % is ___?___ fraction $\frac{49}{100}$

11) 10% of 1000 is ___?___ 100

12) 15% of 44 is ___?___ 6.6

13) 16% of 12 is ___?___ 1.92

14) 9 % of 6 is ___?___ .54

15) $\frac{1}{10}\%$ = ___?___ decimal .001

16) $\frac{4}{5}\%$ = ___?___ decimal .008

17) $\frac{2}{5}\%$ = ___?___ decimal .004

18) 5 is what percent of 25 ___?___ 20%

19) What percent of 16 is 8 ___?___ 50%

20) $1\frac{3}{5}\%$ = ___?___ decimal 1.006

21) What percent of 90 if 9 ___?___ 10%

22) $\frac{3}{5}\%$ = ___?___ decimal .006

23) 15 is what percent of 30 ___?___ 50%

24) 5.5% pf 90 = ___?___ 4.95

25) 6% of 36 is ___?___ 2.16

Interest which your money earns may be either simple interest or compound interest.

Simple interest is figured by formula and uses one value for the principal. This differs from compound interest where the principal is always increasing.

Simple interest is figured by taking your principal (in dollars and cents) times your rate (as a decimal) times the time (in years). The general formula is $I = prt$.

Principal - money on which you're figuring your interest.
Rate - yearly rate (7%) changed to a decimal (.07)
Time - is always in years. If given in days put $\frac{\text{no. of days}}{360}$
if given in months put $\frac{\text{no. of days}}{12}$

Example: What interest would you receive on $1000 at 4% for 90 days.
For 2 years ?

Example:

90 days	2 years
$I = prt$	$I = prt$
$I = 1000 \cdot .04 \cdot \frac{90}{360} \left(\frac{1}{4}\right)$	$I = 1000 \cdot .04 \cdot 2$
$I = \$10$	$I = \$80$

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A 1) I = \$600 x .04 x 2 \$48

2) I = \$400 x .06 x $\frac{1}{2}$ \$12

3) Find I when p = \$800, n = .05 and t = $\frac{1}{4}$ yr. \$10

4) Find I when p = \$300, n = 7% and t = $\frac{1}{3}$ yr. \$7

5) Find I when p = \$416, n = 3%, t = 3 months \$3.12

B 6) Find I when p = \$320, n = 4%, t = $1\frac{1}{4}$ yr. \$16

7) Find I when p = \$214, n = 3.5%, t = 6 months \$3.745

8) Find I when p = \$300, n = $6\frac{1}{2}$%, t = 180 days \$9.75

9) Find t when I = \$24, p = \$240, n = 5% 2 yrs

C 10) Find I when p = \$1214, n = $4\frac{1}{4}$%, t = 2 years \$103.19

11) Find t when I = \$36, p = \$600, n = 4% $\frac{1}{4}$ yr

12) Find n when I = \$48, p = \$3600, t = 6 months 2.66$\frac{2}{3}$%

A 1) $I = \$500 \times .06 \times 1$ $\$30$

2) $I = \$400 \times .04 \times \frac{1}{2}$ $\$8$

3) Find I when $p = \$800$, $n = .07$, $t = \frac{1}{4}$ $\$14$

4) Find I when $p = \$200$, $n = 6\%$, $t = \frac{1}{3}$ $\$4$

5) Find I when $p = \$456$, $n = 3\%$, $t = \frac{1}{4}$ $\$3.42$

B 6) Find I when $p = \$240$, $n = 5\%$, $t = 1\frac{1}{4}$ $\$15$

7) Find I when $p = \$414$, $n = 4.5\%$, $t = \frac{1}{2}$ $\$9.315$

8) Find I when $p = \$400$, $n = 5\frac{1}{2}\%$, $t = \frac{1}{2}$ $\$11$

9) Find t when $I = \$36$, $p = \$600$, $n = 5\%$ $1\frac{1}{5}$ yrs

C 10) Find I when $p = \$2042$, $n = 3\frac{1}{4}\%$, $t = 2$ $\$132.73$

11) Find n when $I = \$6$, $p = \$100$, $t = \frac{3}{4}$ 8%

12) How much money would you have to bank at a simple interest rate of 6% if you want to receive \$30 interest at the end of 6 months?

$\$1000$

A 1) $I = \$500 \times .03 \times 3$ #45

2) $I = \$300 \times .06 \times \frac{1}{3}$ #6

3) Find I when $p = \$900$, $n = .03$ and $t = \frac{1}{3}$ #9

4) Find I when $p = \$250$, $n = .07$, $t = \frac{1}{.5}$ $3.50

5) Find I when $p = \$18$, $n = .035$, $t = \frac{1}{3}$ $.21

B 6) Find I when $p = \$480$, $n = 4\%$, $t = 1\frac{1}{2}$ #28.80

7) Find I when $p = \$158$, n . 4.5%, $t = \frac{1}{2}$ $3.555

8) Find I when $p = \$500$, $n = 7\frac{1}{2}\%$, $t = \frac{1}{4}$ $9.375

9) Find t when $I = \$36$, $p = \$320$, $n = 5\%$ $2\frac{1}{4}$ yrs

C 10) Find I when $p = \$836$, $n = 3\frac{1}{4}\%$, $t = 3$ #81.51

11) Find t when $I = \$48$, $p = \$1000$, $n = 4\frac{1}{2}\%$ $1\frac{1}{15}$ yr

12) What percent of interest would you need to get if you expect to get $60 interest on your investment, if you invest $1600 for $1\frac{1}{4}$ years at simple interest rates? 3%

Compound interest which is common to all savings accounts is figured periodically as a simple interest problem. The next period that the interest is to be figured will be based on a new principal whick is obtained by adding the interest to the previous principal. (New Amount = p + I)

Example: what interest would you receive on $1000 at 4% compounded semi-annually for 2 years.

(1^{st} half year)

$I = prt$

$I = 1000 : .04 \cdot \frac{1}{2}$

$I = \$20$

(2^{nd} half year)

$I = prt$

$I = 1020 \cdot .04 \cdot \frac{1}{2}$

$I = \$20.40$

(3^{rd} half year)

$I = prt$

$I = 1040.40 \cdot .04 \cdot \frac{1}{2}$

$I = \$20.81$ (nearest cent)

(4^{th} half year)

$I = prt$

$I = 1061.21 \cdot .04 \cdot \frac{1}{2}$

$I = \$21.22$

Amount (or new principal) in bank now is old principal + interest

$1000	$1020.	$1040.40	$1061.21
+ 20	+ 20.40	+ 20.81	+ 21.22
$1020	$1040.40	$1061.21	$1082.43

You see when you had the simple interest at the same rate for the same period of time the I = $80, in compound interest the total received was $82.43.

A 1) $400 banked at 6% compounded annually for 4 years. ($504.99)

2) $120 banked at 4% compounded semiannually for 2 years ($129.90)

3) $40 banked at 2% compounded semiannually for 2 years ($41.62)

4) $1000 banked at 4% compounded quarterly for 1 year ($1040)

B 5) $80 invested at 8% compounded semiannually for 2 years ($93.59)

6) $240 banked at 8% compounded quarterly for 2 years ($281.20)

C 7) $1000 invested at 8% compounded semiannually for 2 $\frac{1}{2}$ years ($1216.64)

8) $800 invested at 6% compounded quarterly for 1 $\frac{1}{4}$ years. ($861.83)

9) $315 invested at 5% compounded quarterly for $\frac{3}{4}$ year ($326.97)

10) $400 invested at 2% compounded quarterly for $\frac{1}{2}$ year ($404.01)

11) $128 invested at 7% compounded semiannually for 2 years ($146.89)

A 1) $200 banked at 4% compounded annually for 3 years (#224.97)

2) $400 invested at 2% compounded semiannually for 2 years (#416.24)

3) $800 banked at 6% compounded semiannually for 2 years (#900.41

4) $600 banked at 8% compounded quarterly for 1 year (#649.45)

B 5) $70 banked at 6% compounded semiannually for 2 years (#78.78)

6) $360 banked at 4% compounded quarterly for 2 years (#421.79)

7) $40 invested at 4% compounded semiannually for $1\frac{1}{2}$ year (#42.45)

8) $312 invested at 4% compounded quarterly for 1 year (#324.66)

9) $850 banked at 7% compounded quarterly for $\frac{3}{4}$ year (#894.10)

C 10) $1200 invested at 6% compounded semiannually for $1\frac{3}{4}$ years

(#1475.85)

11) $800 invested at 6% compounded quarterly for $\frac{3}{4}$ year (#836.54)

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A 1) \$2000 banked at 8% compounded semiannually for 1 year (#2163.20)

2) \$180 banked at 2% compounded semiannually for 2 years (#187.31)

3) \$60 banked at 4% compounded quarterly for 1 year (#62.44)

4) \$500 banked at 3% compounded annually for 3 years (#546.36)

B 5) \$90 invested at 6% compounded semiannually for 1$\frac{1}{2}$ years (#98.34)

6) \$360 banked at 3% compounded semiannually for 1$\frac{1}{2}$ years (#376.44)

7) \$450 invested at 8% compounded semiannually for 1$\frac{1}{2}$ years (#506.19)

8) \$875 invested at 6% compounded quarterly for $\frac{3}{4}$ years (#914.97)

C 9) \$800 invested at 6% compounded quarterly for $\frac{3}{4}$ years (#836.54)

10) If you put \$600 in the bank, left it in for 1$\frac{1}{4}$ years at 5 %, (#639.47) and it was compounded quarterly, how much money would be in your account at the end of this time?

11) \$600 at 5% compounded quarterly for $\frac{3}{4}$ year (#622.78)

NOTES (LOANS)

The third purpose of the bank was to loan money to people in need of it.

Banks find why the person needs the money. They also find if the borrower will be able to repay the amount borrowed. This is necessary because the bank will be lending other depositors' money. In every case, they try to take a very small risk when making a loan. The bank reduces their risk by requiring a co-signer or some form of collateral as a guarantee that the loan will be repaid.

Co-signer ——— is a person who signs the note in addition to the borrower. In the event the borrower defaults or does not complete payment, the co-signer would have to pay off the loan.

Collateral ——— some sort of security which the bank will hold until the loan is paid off. If the borrower cannot complete payment the collateral will be used to cover the amount still due. Collateral might be in the form of a title to a car, deed to a house, stocks, bonds, etc.

Most notes will be interest-bearing. This means that the borrower will pay back the face (amount of the note) plus any interest.

$ 600 00/100 WILMINGTON, DELAWARE February 16 1969

six months after date, for value received, the undersigned promises to pay to the order of

ARTISANS' SAVINGS BANK

(HEREINAFTER CALLED THE BANK)

505 MARKET STREET

WILMINGTON, DELAWARE

Six hundred and no/100 Dollars,

with interest at the rate of 8 per centum, per annum, having deposited with the Bank the following property, viz:

title to Buick, Special 1963, motor #7246839

John N. Harris

Address 2410 Charles Rd.

Wilmington, Delaware

Address

A What date was the note in figure? Feb. 16, 1969

Who was the maker? John V. Harris

What is collateral? items or items put up for security

What is the collateral of this note? title of a car

What is the face of this note? $600

What is the time of this note? six months

What is the rate? 8 %

What interest will be paid on this note? $24

What is the date of maturity? Aug 16, 1969

How much must be paid back at the date of maturity? $624

What is meant by "per-annum"? each year

The date of maturity is the date when the note must be completely paid. This is figured by counting the number of actual days, months, or years from the date the note was made.

Example: What is the date of maturity of a note made on July 15, 1969 for 60 days? 1 month? 1 year?

—— for 60 days:

July 15 to July 31 = 16 days
August 1 to August 31 = 31 days
Sept. 1 to Sept. 13 = 13 days
60 days

count each calendar day

September 13, 1969 would be the date of maturity.

—— for 1 month: to the same day of next month

August 15, would be the date of maturity.

—— **for 1** year: to the same day and month of next year.

July 15, 1970 would be the date of maturity.

Figure date of maturity of these notes

		Date made	Time of note	Date of Maturity
A	1)	April 20, 1970	2 yrs.	? Apr 20, 1972
	2)	November 15, 1970	30 days	? Dec 15, 1970
	3)	February 4, 1970	4 months	? June 4, 1970
	4)	January 15, 1970	20 days	? Feb 4, 1970
B	5)	March 15, 1970	45 days	? Apr 29, 1970
	6)	January 15, 1970	9 months	? Oct 15, 1970
	7)	January 24, 1970	45 days	? Mar 10, 1970
	8)	April 16, 1970	3 years	? Apr 16, 1973
C	9)	February 23, 1970	45 days	? Apr 9, 1970
	10)	August 14, 1970	2 yrs. 6 months	? Feb 14, 1973
	11)	September 29, 1970	9 months	? June 29, 1971
	12)	July 18, 1970	4 yrs. 9 months	? Apr 18, 1975

Figure date of maturity of these notes

	Date made	Time of Note	Date of Maturity
A	1) February 5, 1970	15 days	? Feb 20, 1970
	2) December 19, 1970	10 days	? Dec 29, 1970
	3) September 18, 1970	2 yrs.	? Sept 18, 1972
	4) May 22, 1970	6 months	? Nov 22, 1970
B	5) January 22, 1970	30 days	? Feb 21, 1970
	6) February 18, 1970	45 days	? Apr 4, 1970
	7) December 20, 1970	1 month	? Jan 20, 1971
	8) October 9, 1970	4 months	? Feb 9, 1971
C	9) February 20, 1970	45 days	? Apr 6, 1970
	10) December 14, 1970	1 yr. 3 months	? Mar 14, 1972
	11) July 8, 1970	6 months	? Jan 8, 1971
	12) July 14, 1970	3 yrs. 4 months	? Nov 14, 1973

Figure date of maturity of these notes

		Date made	Time of Note	Date of Maturity
A	1)	January 4, 1970	1 year	? Jan. 4, 1971
	2)	February 9, 1970	15 days	? Feb 24, 1970
	3)	November 6, 1970	1 month	? Dec 6, 1970
	4)	April 14, 1970	10 days	? Apr 24, 1970
B	5)	January 8, 1970	45 days	? Feb 22, 1970
	6)	February 15, 1970	30 days	? Mar 17, 1970
	7)	February 15, 1970	1 month	? Mar 15, 1970
	8)	March 20, 1970	30 days	? Apr 19, 1970
C	9)	January 8, 1970	45 days	? Feb 22, 1970
	10)	February 25, 1970	45 days	? Apr 11, 1970
	11)	April 20, 1970	1 yr. 30 days	? May 20, 1971
	12)	June 4, 1970	2 yrs. 6 months	? Dec 4, 1972

There are three general ways a loan may be paid:

1) At the date of maturity the borrower will repay the face of the note (amount borrowed), plus any interest.

Example: A person borrows \$2000 at 7% for 2 years.

I = 2000 x .07 x 2 or

\$280 he will repay in one payment \$2000 + \$280 or \$2280

2) The interest may be taken out from the face of the note before the borrower receives the money. This is a bank discount note. The interest when it is taken out at the time of the loan is called the bank discount.

Example: A person borrows \$2000 at 7% for 2 yrs.

I = prt I = \$2000 x .07 x 2

The bank will then take the \$280 from \$2000 (\$2000 - 280 = \$1720). Borrower receives \$1720. He pays back \$2000 at the date of maturity.

3) The payments may be divided into monthly payments.

Example: A person borrows \$2000 at 7% for 2 yrs.

I = 2000 x .07 x 2 or \$280

Total amount to be paid back = \$2280

$$\text{monthly payments} = \begin{array}{r|l} & \overline{\$95.\ \text{a month}} \\ 24 & 2280. \\ & \underline{216} \\ (2\text{yr}) & 120 \\ & 120 \end{array}$$

If it comes out uneven, the last (24th) payment can be increased or decreased.

A 1) A person borrows $2000 at 8% for 2 years. If he pays it all back at the end of the two years, what will the amount be? $2320

2) Henry signs a bank discount loan for $800 at 6% for 3 years.

How much is the bank discount? $144

How much does Henry receive at the time he makes the note? $656

3) Mr. Hanson borrowed $200 to purchase storm windows. He arranged a loan at 8% for 1 year. This was to be paid back in monthly payment during the year.

How much would he pay each month? $18 a month

B 1) How much would you pay at the end of a year and half. If you borrowed $550 at 7.5% for that period of time? $611.88

2) What is the bank discount on a loan of $450 at $4\frac{1}{2}$% for 90 days? $5.06

3) If you bought a refrigerator for $200 and the company charged you 8%. $12.44 + last payment $12.52

How much would you have to pay each month if you paid it off in 18 months?

A 1) Mary Wilson owns a fashion shop. She needs to borrow $750. The bank will lend it to her for 60 days at 6% interest. How much will she return to the bank at the end of the 60 days? $757.50

2) On a bank discount note for $1800. How much money would you expect to receive if the loan is at 8% for six months? $1728

3) You buy a car for $400. The dealer charges you 8% interest. You are going to pay for the car in 24 months (2 years). How much will your monthly payments be?

$19.33
+
last payment $19.41

B 1) What is total payed back on a loan of $450 at 7% for 45 days? $453.94

2) What is the bank discount on a loan of $720 for 9 months at a rate of 6% $32.40

3) You purchase a TV set for $380. You intend to pay it off in 18 months. The dealer charges you $5\frac{1}{2}$%. What would your monthly payments be?

$22.85
last month $22.90

CREDIT UNIONS

When you start your first job and have a reason to borrow money, you will probably find that your company or trade union headquarters will have a credit union. This is for the good of the workers.

You may save money in a credit union account and your money will get interest as money in a bank.

You may also take out a loan. Loans up to a certain amount may be received with just your signature. Larger loans must be backed with some form of collateral.

In the Wilmington Teachers Credit Union, loans are repaid monthly. The rate is three-quarters of one percent ($\frac{3}{4}$% or .0075) of the unpaid balance.

An example of a loan of $300 for 12 months at $25 a month is shown on the next page. Notice that the monthly interest is always $\frac{3}{4}$% of the balance due.

In the example you find the interest as $\frac{3}{4}$% of unpaid balance or

$\frac{3}{4}$% of 300 = .0075 x 300 = $2.25

To figure the interest for the second month you take $\frac{3}{4}$% of unpaid balance or $\frac{3}{4}$% of $275 = .0075 x $275 = $2.06

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SMALL LOAN FOR
— Appliance
— Hi Fi
— Wardrobes
— Car Repairs
— Air Conditioner
— Furniture

WILMINGTON TEACHERS FEDERAL CREDIT UNION
Health and Guidance Center
625 East 10th Street
Wilmington, Delaware
Telephone: OL 4-3181, extension 309
Office Hours: 11 A.M. to 4:30 P.M.
Monday through Friday

Monthly payments for $300 loan for 12 months

	Total monthly payment	Payment on principal	Monthly interest	Balance due on principal
1st month	$27.25	$25.00	$2.25	275.00
2nd month	27.06	25.00	2.06	250.00
3rd month	26.88	25.00	1.88	225.00
4th month	26.69	25.00	1.69	200.00
5th month	26.50	25.00	1.50	175.00
6th month	26.31	25.00	1.31	150.00
7th month	26.13	25.00	1.13	125.00
8th month	25.94	25.00	.94	100.00
9th month	25.75	25.00	.75	75.00
10th month	25.56	25.00	.56	50.00
11th month	25.38	25.00	.38	25.00
12th month	25.18	25.00	.13	00.00
			$14.63	

BORROWERS' INSURANCE

This insurance covers the amount of the loan made. It is paid for by the Credit Union. There is no upper limit on borrowers' insurance.

ALL TRANSACTIONS ARE CONFIDENTIAL

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In all these Credit Union problems, assume that the interest rate is $\frac{3}{4}$ of 1% of the unpaid balance.

A 1) If you borrowed \$90 from a credit union and decided to pay them \$12 a month, what interest would be taken out the first month? \$.68 What amount would be credited against the principal? What would \$12.00 remain to be paid? \$78.00

B 2) You borrow \$200 from the credit union, you decide to pay \$20 a \$140 month. How much would you have left to pay at the end of 3 months? What interest was paid? \$3.55

C 3) You buy a car for \$1200 and finance it through the credit union. How much would you have paid back at the end of 6 months if you \$360 paid \$60 a month? What interest was paid? \$47.25 int

In the problems use this form when necessary

Number of payment	Total Monthly payment	Payment on Principal	Monthly Interest ($\frac{3}{4}$ of 1%)	Balance of Principal due

A 1) If you borrowed $100 from a Credit Union and paid them $10 a month. After the payment of your interest, what will be the balance of principal due at the end of 3 payments.

$70

B 2) The credit union has loaned you $600 for a year. You said you want to pay $50 a month. How much would you have left to pay on this loan after three months.

$450

int $12.38

C 3) A loan of $400 is paid back to the credit union in 1 year. You decide to pay $33.35 month. Show each months interest, credit, and the balance for 4 months.

Use this form when necessary

Number of payment	Total Monthly payment	Payment on Principal	Monthly Interest ($\frac{3}{4}$ of 1%)	Balance of principal due
				$400
1	$36.50	$33.35	$3.00	$366.65
2	$36.10	$33.35	$2.75	$333.30
3	$35.85	$33.35	$2.50	$299.95
4	$35.60	$33.35	$2.25	$266.60

A 1) A $150 loan for one year through a Credit Union will require monthly payments of approximetely $16 a month. **Find** the balance to be paid at the end of 3 months. #102

B 2) You are going to pay off a loan of $84 in six months. You are figuring in paying $14 a month. Show the work for three months payment and interest paid.

C 3) A credit union loans $300 to you. You are to pay it off in six months. Your monthly payment will be $50. Show how they figure all six months interest and balance credits each month.

Use this form when necessary

Number of payment	Total Monthly payment	Payment on Principal	Monthly Interest ($\frac{3}{4}$ of 1%)	Balance of principal due
				#84
1	#14.63	#14	# .63	#70
2) 2	#14.53	# 14	# .53	#56
3	#14.42	# 14	# .42	#42
				#300
1	#52.25	#50	#2.25	#250
2	#51.88	#50	#1.88	#200
3	#51.50	#50	#1.50	#150
3) 4	#51.13	#50	#1.13	#100
5	#50.75	#50	# .75	#50
6	#50.38	#50	# .38	—

PURCHASE OF A CAR

You are going to buy a new car. It is a "souped-up" 1970 Cougar. You are trading in your 1968 Chev. Impala S.S.

Let's follow the steps in this purchase to see how you, the dealer, and the bank arrive at the final agreement. Use the next three forms.

Let's look at the Dealer's Work Sheet

This is the form used for the mathematics of the deal.

The top of the form explains what type of car is being purchased and what special equipment goes with it.

The Cash Sale Delivered Price is gross (total) cost of car	$4180.70
Total Down Payment (Trade-in + cash down payment)	$2180.70
Unpaid Cash Price Balance (Remainder to be financed)	$2000.00
Charge for Creditor Life Insurance (Look at finance table under unpaid balance of $2000 for 36 months)	$36.97
Principal Balance (Total of unpaid bal. + life insurance)	$2036.97
Finance Charge (Look at finance table at $2000 for 36 mo.)	$427.59
Amt. of Contract (Look at finance table at $2000 for 36 mo. under payment__ $68.46 for each month) or	$2462.56
Total Time Price (Total down payment amount of contract)	$4645.26

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DEALER'S WORK SHEET

DATE 9-29 1969

Car Sold ☒ New ☐ Used — Year 1970 No. Cyl. 8 Make Cougar Body Type Coupe Model No. XR7

Check following equipment included in the Cash Sale Delivered Price.

☒ Radio ☐ Automatic Trans. ☐ Power Steering ☐ Power Windows ☒ High H/P Engine (Describe) 428" C.I.

☒ Heater ☐ E-Z Eye Glass ☒ Power Brakes ☐ Power Seats ☐ Air Conditioning 4 speed Transm.

CASH SALE DELIVERED PRICE (including Sales Tax, accessories or extra equipment, if any) $ 4180.70 (1)★

Gross Trade-in allowance $ 2205.70

Pay-off on open account $ 325.00

TOTAL DOWN PAYMENT—Net Trade-in allowance $ 1880.70 ★ $ 300.00 (CASH) ★ 2180.70 (2)★

TRADE-IN—Make Chevrolet Model Impala S.S. Year 1968

UNPAID CASH PRICE BALANCE (Difference between Items 1 and 2)........................ 2000.00 (3)★

COST OF CAR INSURANCE — PASS. CAR SYMBOL - GROUP - COLL. DED. $ - COLL. CLASS - TERM OF INS. - NONE (4A)★

OTHER COSTS—Describe ________ NONE (5)★
(As defined in Item No. 5 of retail contract)

UNPAID BALANCE (Sum of Items 3, 4A and 5) [Suggest adjustment of Down Payment to eliminate cents in Unpaid Balance.] .. 2000.00 (5A)

CHARGE FOR CREDITOR LIFE INSURANCE, if any........................ 36.97 (4B)★

CHARGE FOR CREDITOR DISABILITY INSURANCE, if any........................ -0- (4C)★

PRINCIPAL BALANCE (Sum of Items 5A, 4B and 4C)........................ 2036.97 (6)★

FINANCE CHARGE (Difference Between Items 6 & 8)........................ 427.59 (7)★

AMOUNT OF CONTRACT (Time Balance) Obtained from Payment Chart No. 7% 2464.56 (8)★

PAYABLE IN 36 INSTALMENTS OF $ 68.46 ★ OR AS INDICATED IN SPACE BELOW

TOTAL TIME PRICE (Add Items 2 and 8)........................ 4645.26 (9)★

	Unpaid Balance	Creditor Life Ins.	Creditor Disability Ins.	Principal Balance	Amount of Contract	Monthly Payments
Complete from payment charts if "Unpaid Balance" financed (Item 5A) requires the use of Adjustment Figures	$ 2000.00	$ 36.97	$ -	$ 2036.97	$ 2464.56	$ 68.46
TOTALS	$ 2000.00	$ 36.97	$ -	$ 2036.97	$ 2464.56	$ 68.46

★Copy figures on contract

CARS FOR HIRE

Will car be used as: ☐ Taxicab ☐ U-Drive ☐ Livery ☐ Other — Explain ________

COMMERCIAL CARS AND TRUCKS

(To be completed ONLY when MIC insurance is included)

Contract Covers:

☐ CHASSIS ☐ CAB ☐ BODY ☐ TRUCK TYPE TRACTOR — COST $ ________ ☐ SEMI-TRAILER — COST $ ________ CAPACITY: ________ TONS

Distance of Operation—☐ Up to 50 miles ☐ Up to 150 miles ☐ Over 150 miles **Use of Truck** ________ (State type of goods to be hauled)

Used Commercial Cars Only—Cost of car insurance based on (check which):

☐ List Price of Chassis only............. $ ________ ☐ Original Cost New (Complete Truck) $ ________

COMMENTS ________

DEALER'S NAME ________

What's in the Order Form ?

This order form shows all the details of the information from the Dealer's Work Sheet. It tells exactly what you are getting, what you are trading in, and a breakdown of the financing. This order when signed becomes legally binding on your purchase.

You can see the break down of the $4180.70 Cash Sale Delivered Price which was listed on your Dealers Work Sheet.

Under "Credits" you see the balance which you still owe GMAC (General Motors Acceptance Corporation) for $325.

You will see your yearly interest rate is 7%

You will also know who is handling the financing. In this case it is the Farmers Bank.

Before signing this Order you should have it explained to you and should understand exactly what you are signing.

Payment Table

This is based on the amount of money you are financing. First, look to see if you want the 30 or the 36 month chart. Secondly, you look at the column which represents your unpaid balance (amount to be financed. Reading from left to right you will find:

1) The monthly payment

2) The face of the note (or loan)

3) Cost of the insurance required

4) Interest charged.

STOCK NO. M593

HOLIDAY LINCOLN MERCURY

[redacted]
WILMINGTON, DELAWARE 19899
POrter 4-5900

LINCOLN CONTINENTAL
Comet
MERCURY

Order Form

PURCHASER'S NAME John R. MASTON Jr. (PRINT OR TYPE)

DATE Sept. 29 19 69

PLEASE ENTER MY ORDER FOR ONE ☒ NEW ☐ USED AS FOLLOWS:

MAKE MERCURY	MODEL Cougar	COLOR Rally RED	TYPE XR7 Coupe	YEAR 19 70
TYPE WARRANTY Now Car	SERIAL NO. 9H10F237056		TO BE DELIVERED ON OR ABOUT Sept. 30	19 69

CASH PRICE OF CAR

BASE PRICE	3315	00
TRANSPORTATION charge	75	00
four Speed TRANSMISSION	no change	
335 H.P. Engine C.J. 428"	336	70
High Performance AXLE	6	50
COMPETITION HANDLING PACKAGE	31	10
SPORTS CONSOLE	57	10
OUTSIDE RACING MIRROR	13	00
POWER DISC BRAKES	64	80
A.M. RADIO	60	90
RAM AIR INDUCTION	138	60
WIRE Wheel COVERS	51	90
TOTAL	4150	70
REGISTRATION & TITLE FEE	30	00
TOTAL CASH DELIVERED PRICE	4180	70

HOLIDAY INSURANCE

DEDUCT ______ CL ______
SYL ______ TERM ______
AREA ______ AMT ______

OUTSIDE

COMPANY STATE Farm
AGENT Jos. Mills
ADDRESS Fairfax Sh. Cent.
TYPE COV. 50^{00} ded.

CREDITS

CASH DEPOSIT SUBMITTED WITH ORDER			300	00
ALLOWANCE FOR USED CAR TRADE-IN, AS APPRAISED	2205	70		
LESS BALANCE OWING TO— G.M.A.C. Corp.	325	00	1880	70
CASH TO BE PAID AT TIME OF DELIVERY				

DESCRIPTION OF TRADE-IN

MAKE Chevrolet	MODEL Impala S.S.	TYPE CONVERT.	YEAR 19 68
SER NO 68F230971	LICENSE NO Del. 198052	CHART 7%	

TOTAL CREDITS	2180	70
BALANCE DUE	2000	00
TIME SALE CHARGES	464	56
AMOUNT OF CONTRACT	2464	56

CONTRACT TO BE PAID TO FARMERS BANK IN 36 INSTALLMENTS OF $ 68.46 EACH MO. AND
ONE INSTALLMENT OF $ NONE FIRST INSTALLMENT DUE NOV. 1 19 69

The front and back of this Order comprise the entire agreement affecting this purchase and no other agreement or understanding of any nature concerning same has been made or entered into, or will be recognized. I hereby certify that no credit has been extended to me for the purchase of this motor vehicle except as appears in writing on the face of this agreement.

I have read the matter printed on the back hereof and agree to it as a part of this order the same as if it were printed above my signature. I certify that I am 21 years of age, or older, and hereby acknowledge receipt of a copy of this order.

Bob Fisher
SALESMAN

APPROVED Francis G. Talmo
THIS ORDER IS NOT VALID UNLESS SIGNED AND ACCEPTED BY DEALER

BY OK. Farmers Bank for 36 mos.
SUBJECT TO SATISFACTORY CREDIT RATING

176

CREDIT APPROVED C. J. Millione

SIGNED John R. Maston Jr. PURCHASER

ADDRESS 510 NORWOOD Rd.
WINSTON Hgts. Wilm., Del.

RES. PHONE 795-0326

BUS. PHONE 795-9544

THE REYNOLDS & REYNOLDS CO., CELINA, OHIO J.67848 LITHO IN U.S.A.

Payment Table
7%

UN-PAID BAL.	30 MONTHS				36 MONTHS			
	PAY'T	NOTE	LIFE	CHARGE	PAY'T	NOTE	LIFE	CHARGE
$ 1	$ .03	$ .90	$ .00	$ -.10	$ .03	$ 1.08	$ .02	$ .06
2	.07	2.10	.03	.07	.06	2.16	.04	.12
3	.11	3.30	.05	.25	.10	3.60	.06	.54
4	.15	4.50	.06	.44	.13	4.68	.08	.60
5	.19	5.70	.08	.62	.17	6.12	.10	1.02
6	.23	6.90	.09	.81	.20	7.20	.11	1.09
7	.27	8.10	.11	.99	.23	8.28	.13	1.15
8	.31	9.30	.12	1.18	.27	9.72	.15	1.57
9	.35	10.50	.14	1.36	.30	10.80	.17	1.63
10	.39	11.70	.15	1.55	.34	12.24	.19	2.05
20	.79	23.70	.30	3.40	.68	24.48	.37	4.11
25	.99	29.70	.38	4.32	.85	30.60	.46	5.14
30	1.19	35.70	.45	5.25	1.02	36.72	.56	6.16
40	1.59	47.70	.60	7.10	1.36	48.96	.74	8.22
50	1.98	59.40	.75	8.65	1.71	61.56	.93	10.63
60	2.38	71.40	.90	10.50	2.05	73.80	1.11	12.69
70	2.78	83.40	1.05	12.35	2.39	86.04	1.30	14.74
75	2.98	89.40	1.12	13.28	2.56	92.16	1.39	15.77
80	3.18	95.40	1.20	14.20	2.73	98.28	1.48	16.80
90	3.57	107.10	1.34	15.76	3.08	110.88	1.67	19.21
100	3.97	119.10	1.49	17.61	3.42	123.12	1.85	21.27
200	7.95	238.50	2.99	35.51	6.84	246.24	3.70	42.54
300	11.92	357.60	4.47	53.13	10.26	369.36	5.55	63.81
400	15.90	477.00	5.97	71.03	13.69	492.84	7.40	85.44
500	19.87	596.10	7.46	88.64	17.11	615.96	9.24	106.72
600	23.85	715.50	8.95	106.55	20.53	739.08	11.09	127.99
700	27.82	834.60	10.44	124.16	23.96	862.56	12.94	149.62
800	31.80	954.00	11.93	142.07	27.38	985.68	14.79	170.89
900	35.77	1,073.10	13.42	159.68	30.80	1,108.80	16.64	192.16
1,000	39.75	1,192.50	14.91	177.59	34.23	1,232.28	18.49	213.79
1,100	43.72	1,311.60	16.40	195.20	37.65	1,355.40	20.34	235.06
1,200	47.70	1,431.00	17.89	213.11	41.07	1,478.52	22.18	256.34
1,300	51.67	1,550.10	19.38	230.72	44.50	1,602.00	24.03	277.97
1,400	55.65	1,669.50	20.87	248.63	47.92	1,725.12	25.88	299.24
1,500	59.62	1,788.60	22.36	266.24	51.34	1,848.24	27.73	320.51
1,600	63.60	1,908.00	23.85	284.15	54.77	1,971.72	29.58	342.14
1,700	67.57	2,027.10	25.34	301.76	58.19	2,094.84	31.43	363.41
1,800	71.55	2,146.50	26.84	319.66	61.61	2,217.96	33.27	384.69
1,900	75.52	2,265.60	28.32	337.28	65.04	2,341.44	35.13	406.31
2,000	79.50	2,385.00	29.82	355.18	68.46	2,464.56	36.97	427.59
2,100	83.47	2,504.10	31.31	372.79	71.88	2,587.68	38.82	448.86
2,200	87.45	2,623.50	32.80	390.70	75.31	2,711.16	40.67	470.49
2,300	91.42	2,742.60	34.29	408.31	78.73	2,834.28	42.52	491.76
2,400	95.40	2,862.00	35.78	426.22	82.15	2,957.40	44.37	513.03
2,500	99.37	2,981.10	37.27	443.83	85.58	3,080.88	46.22	534.66
2,600	103.35	3,100.50	38.76	461.74	89.00	3,204.00	48.06	555.94
2,700	107.32	3,219.60	40.25	479.35	92.42	3,327.12	49.91	577.21
2,800	111.30	3,339.00	41.74	497.26	95.85	3,450.60	51.76	598.84
2,900	115.27	3,458.10	43.23	514.87	99.27	3,573.72	53.61	620.11
3,000	119.25	3,577.50	44.72	532.78	102.69	3,696.84	55.46	641.38
3,100	123.22	3,696.60	46.21	550.39	106.12	3,820.32	57.31	663.01
3,200	127.20	3,816.00	47.70	568.30	109.54	3,943.44	59.16	684.28
3,300	131.17	3,935.10	49.19	585.91	112.96	4,066.56	61.00	705.56
3,400	135.15	4,054.50	50.69	603.81	116.39	4,190.04	62.86	727.18
3,500	139.12	4,173.60	52.17	621.43	119.81	4,313.16	64.70	748.48

Chart 71

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'66 PLYMOUTH

Fury I blue station wagon, auto. trans., 8 cyl., radio, heater, power steering & brakes,
Was $1895 Sale $1055

'68 MUSTANG

2 + 2, burgandy, auto trans., 8 cyl., radio, heater, power steering. Was $2595. SALE $2088

'66 MERCURY

Cyclone convert., red. 4 speed trans. 390 V-8, radio, heater.
Was $1895. SALE $1474

'65 COMET

Station Wagon blue, auto trans., 6 cyl., radio heater.
Was $1495. SALE $999

'67 CHEVROLET

Impala 4 door, hardtop, blue, auto trans., 8 cyl., radio, heater, power steering
Was $2395 Sale $1944

'67 CHEVROLET

Impala, 2 door hardtop, green, auto trans., 8 cyl., radio, heater, power steering
Was $2395 Sale $1899

'68 LINCOLN

Continental Coupe, green, vinyl roof leather int., factory air cond loaded, like new, low mileage Save $$$

'66 MERCURY

Montclair 4 door hardtop, auto. trans., 8 cyl., radio, heater, power steering and brakes, factory air condition, black.
Was $2095. SALE $1589

'66 BUICK

LeSabre, 4 door, auto. trans., 8 cyl., radio, heater, power steering and brakes, factory air condition, blue.
Was $2195 SALE $1858

HOLIDAY

LINCOLN-MERCURY

38th and MARKET STS.

764-5900

THIS WEEK: New 1969 LeSabres

Air Conditioned, Automatic Transmission Power Steering and Brakes. Many More Deluxe Extras - And a Choice of Colors

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Liberty Buick

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FORDLAND

PONY Sale

Featuring The 1969

2 DOOR CORTINA

For Only $1849.00

Fully Delivered Price

Courtesy FORD

1967 PONTIAC. G.T.O. 2 dr., Hardtop, Auto., Radio, Power Steering & Brakes, Green, #787A. $2255

1969 OLDS 98 Luxury, 4 door, Hardtop, Auto., Radio, Power Steering & Brakes, Power Windows and seat, FACTORY AIR COND., White, #005. $4995

1968 PONTIAC GTO 2 dr Hardtop. 4 speed trans., Radio, Blue, #893A $1926

1969 OLDS 98 Luxury Sedan, Auto., Stereo Radio, Power Steering & Brakes, Power Windows & Seat, FACTORY AIR COND., Yellow #015 $4780

1969 OLDS Cutlass 4 dr. Sedan Auto., Radio, Power Steering & Brakes, FACTORY AIR COND., Gray, #124 $3320

1968 CHEV. Impala SS Convert., Auto., Radio, Power Steering and Brakes, Red, #109A. $1760

1966 OLDS 98 Luxury Sedan, Auto., Radio, Power Steering & Brakes, Power Windows & Seat, FACTORY AIR COND., Blue, #874A. $2480

1968 OLDS Dynamic 88 4 dr., Hardtop, Auto., Radio, Power Steering & Brakes, FACTORY AIR COND., Green, $2360 #883A.

1964 OLDS F-85 Wagon, Auto., Radio, Power Steering and Brakes, FACTORY AIR COND., Blue, #644A. $1530

1966 BUICK Wildcat Convert., Auto., Radio, Power Steering & Brakes, Yellow, #711A. $1785

DELAWARE OLDS

A Use the table given:

1) Upon purchase of a car your Amount of Contract (Amount left to be financed) is given. Fill in all the following information; the monthly payment, the face of the note, the life insurance charge, and the interest charge on your note.

Amount of Contract	Time	
a) $200	30 months	$7.95, $238.50, $2.99, $35.51
b) $2000	30 months	$79.50, $2385, $29.82, $355.18
c) $700	36 months	$23.96, $862.56, $12.94, $149.62
d) $2700	36 months	$92.42, $3327.12, $49.91, $577.21
e) $3400	30 months, also 36 months	$135.15, $4054.50, $50.69, $603.81 $116.39, $4190.04, $62.86, $727.18

2) If you could afford to pay about the given number of dollars per month, then approximately what price car could you purchase if you have no trade-in or down payment.

a) $43.72	30 months	$1100
b) $61.61	36 months	$1800
c) $103.35	30 months	$2600
d) $47.92	36 months	$1400

B 3) Using the idea of the Dealers Work Sheet and the 7% Table, show the financing in this deal.

a) From the previous page you bought the 1966 Plymouth from Holiday Lincoln Mercury. You had no trade-in, but gave them $155 in cash. Figure the financing for 30 months

$35.77 month
$1073.10 face
$13.42 ins
$159.68 int

A Use the table given:

1) Upon purchase of a car your amount of contract (amount left to be financed) is given. Fill in all the following information: the monthly payment, the face of the note, the life insurance charge, and the interest charge on your note.

Amount of Contract	Time	
a) $700	30 months	$27.82, $834.60, $10.44, $124.16
b) $2700	36 months	$92.42, $3327.12, $49.91, $577.21
c) $800	30 months	$31.80, $954, $11.93, $142.07
d) $2400	36 months	$82.15, $2957.40, $44.37, $513.03
e) $3500	30 months	$139.12, $4173.60, $52.17, $621.43

2) If you could afford to pay about the given number of dollars per month then approximately what price car could you purchase if you have no trade-in or down payment.

Approximate Monthly Payment	Time	
a) $47.70	30 months	$1200
b) $71.88	36 months	$2100
c) $123.22	30 months	$3100
d) $58.19	36 months	$1700

B 3) Use the idea of the Dealers Work Sheet and the 7% Table.

a) Courtesy Ford has a sale on a 2-door Cortina. You intend to trade-in your car for $349 and give them $100 in cash. Figure all the financing for 30 months.

$55.65 month $20.87 ins
$1669.50 face $248.63 int

b) You are going to buy the 1966 Oldsmobile Dynamic 88 as advertised by Delaware Olds. You are going to give them $300 in cash and your old car, worth $260 in trade in. Figure all financing for 36 months.

$61.61 month
$2217.96 face
$33.27 life
$384.69 interest

A Use the table given:

1) Upon purchase of a car, your Amount of Contract (amount left to be financed) is given. Fill in all the following information: the monthly payment, the face of the note, the life insurance charge, and the interest charge on your note.

Amount of Contract	Time	
a) $400	30 months	$15.90, $477, $5.97, $71.03
b) $2200	30 months	$87.45, $2623.50, $32.80, $390.70
c) $600	36 months	$20.53, $739.08, $11.09, $127.99
d) $2500	30 months	$99.37, $2981.10, $37.27, $443.83
e) $3300	36 months	$112.96, $4066.56, $61, $705.56

B Use table:

2) If you could afford to pay about the given number of dollars per month then approximately what price car could you purchase if you have no trade-in or down payment.

a) $35.77	30 months	$900
b) $68.46	36 months	$2000
c) $111.30	30 months	$2800
d) $51.34	36 months	$1500

C 3) Use the idea of the Dealers Work Sheet and the 7% table.

a) You purchase the Buick as advertised by Liberty Buick. They accept your car in trade for $1178. You make no cash deposit. Show the financing for 36 months

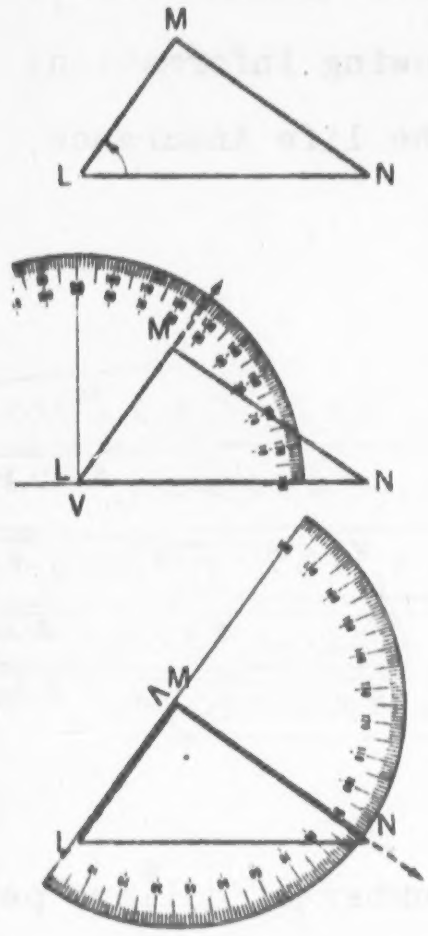
$95.85 month $51.76 life
$3450.60 face $598.84 int

b) Holiday has a '68 Mustang for sale. You have no trade-in but put down $388 in cash. Show financing for 30 months.

$67.57 month
$2027.10 note
$25.34 life
$301.76 interest

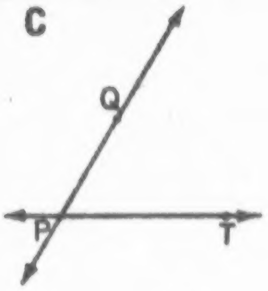
GEOMETRY

UNIT IV



Geometry —— one of the oldest subjects in mathematics —— and one of the newest. From the time of the ancient mathematician Euclid, to the design of future space vehicles, geometry is important. Wherever physical objects have been under consideration, there geometry has been called in to help with the understanding.

C



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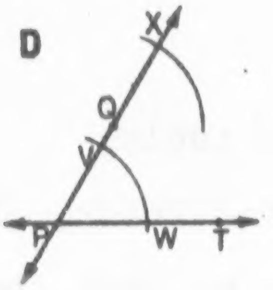

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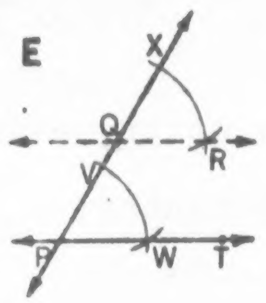

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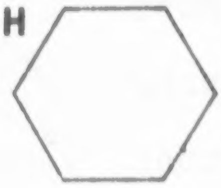

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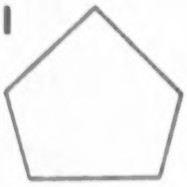

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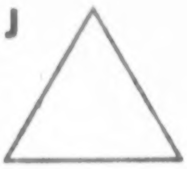
J



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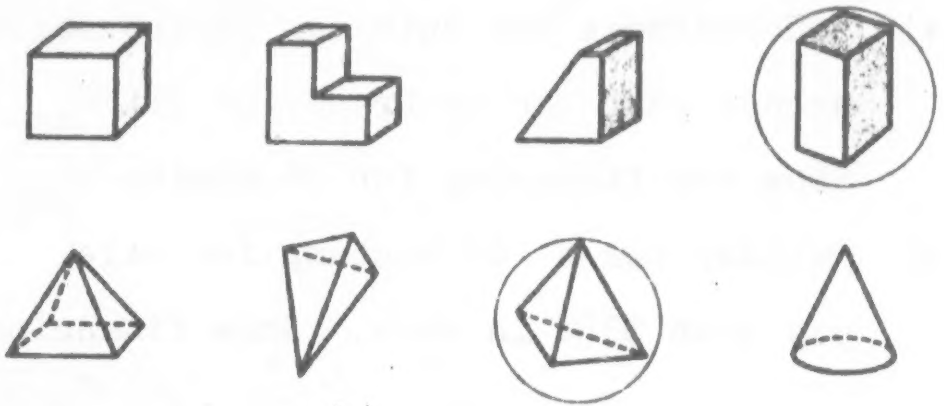
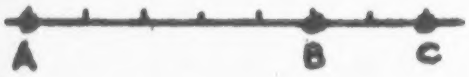


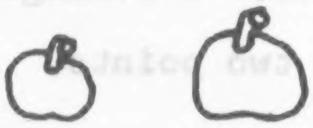
Geometry

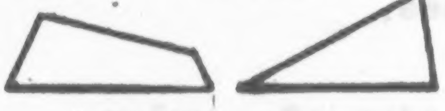
Geometry is concerned with the size, shape, and position of objects. Size has to do with measurement. Shape has to do with figures. Position has to do with distance.

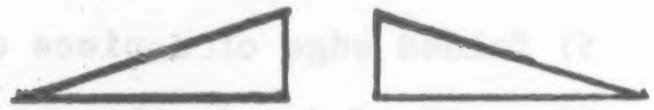
See if you can understand the diagrams well enough to relate one (or more) of these words —— size, shape, position. Write the word after the diagram.

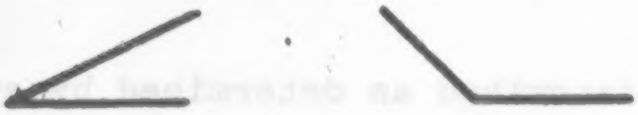
1) 

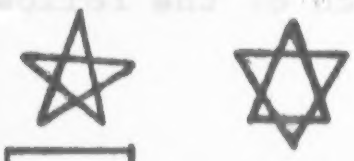
position, size

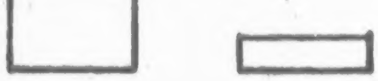
2) 
size

3) 
shape

4) 
position

5) 
size

6) 
shape

7) 
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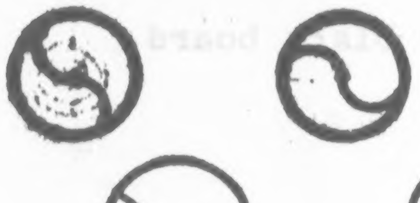
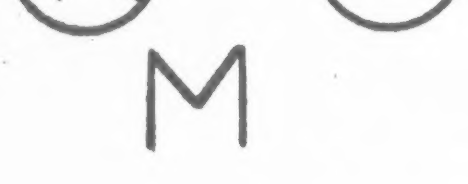
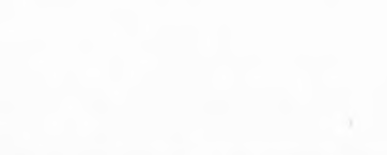
8) 
position

9) 
position

10) 
shape

Students will have to discuss the ideas of size, shape, and position before starting this exercise. Look for the thing that is different in each drawing. If size and shape are the same, position is the answer. Or, shape and position may not be as important as size, and so on. Find some physical objects to demonstrate this lesson.

Points, Lines, and Planes

If a Point is a reference mark, tell in a few words how each of the following can be regarded as points. Name some more.

1) a pencil dot
2) the earth in space
3) an ant
4) a person
5) a cottage on a lake shore
6) the stars in the Big Dipper

A Line has been described as a series of points. A straight line is described as the shortest path of points between two points. Tell why these objects might represent straight lines.

1) a stretched rubber band
2) the path of a bullet
3) a crease
4) the edge of a ruler
5) folded edge of a piece of paper
6) trail of jet in the sky

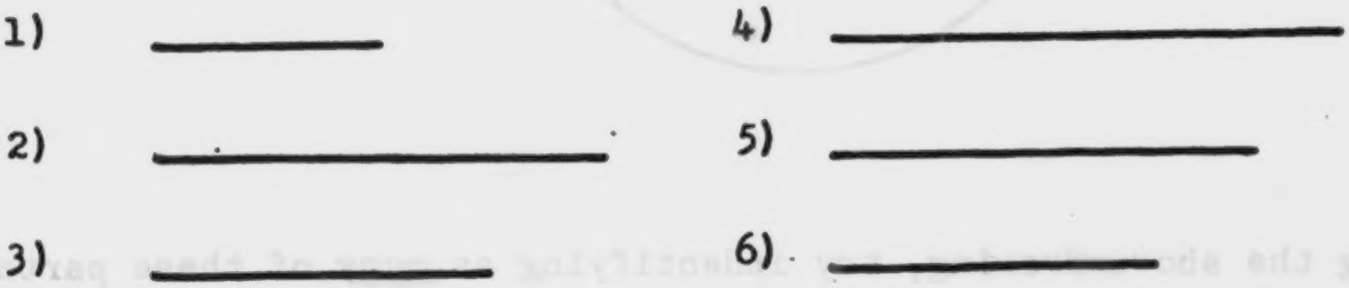
A plane, or flat surface, may be described as determined by straight lines through three different points. Tell why each of the following can be regarded as a plane.

1) one face of a cube
2) the classroom floor
3) a wall
4) a lake
5) the desk top
6) the black board

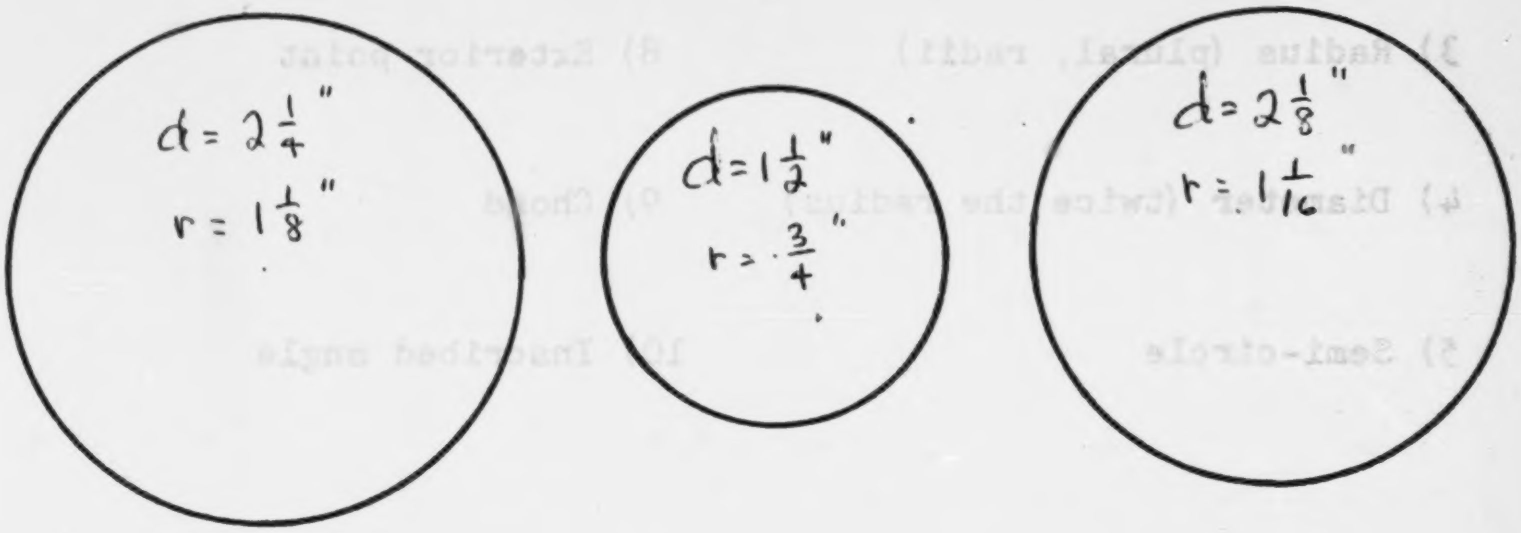
Learning To Use The Compass

We draw circles with compasses, but the compass is an instrument for measuring. The distance between the "needle" of a compass and the lead pencil point, is called the radius. Thus we make circles of different size according to the measure of this radius.

Do not open the compass on the edge of a ruler to get a radius. Use the ruler to draw a line segment the length of the radius you wish. Draw six circles using the following line segments as radii.



Find the radius of each of these circles. Do this by using your ruler to get the largest width (diameter) of the circle. Take one half of the diameter to get the radius.

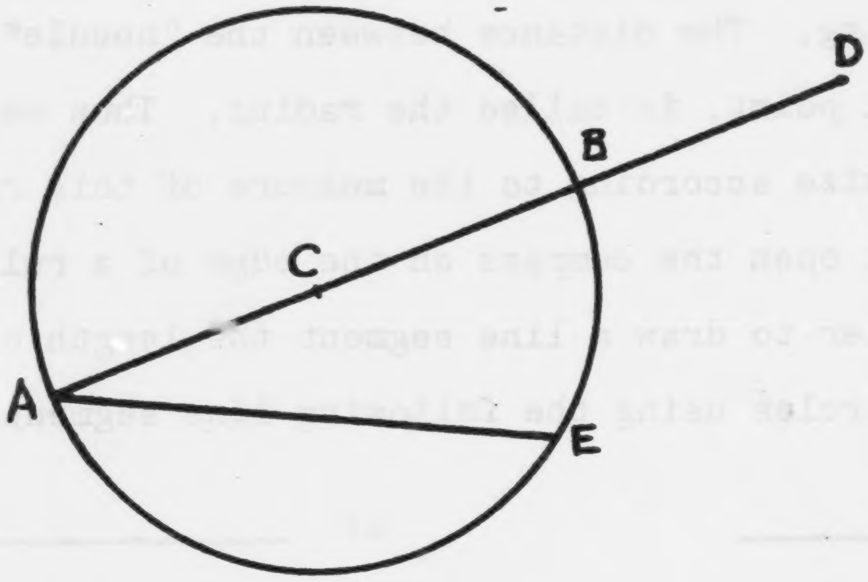


$d = 2\frac{1}{4}$"
$r = 1\frac{1}{8}$"

$d = 1\frac{1}{2}$"
$r = .\frac{3}{4}$"

$d = 2\frac{1}{8}$"
$r = 1\frac{1}{16}$"

Parts of a Circle



Using the above drawing, try i~~d~~dentifying as many of these parts as you can. Write the letters after the words.

1) Center

2) Circumference

3) Radius (plural, radii)

4) Diameter (twice the radius)

5) Semi-circle

6) Arc

7) Interior point

8) Exterior point

9) Chord

10) Inscribed angle

ditto
available

Practice

Multiply:

1) 90°
x 2
180°

2) 90°
x 3
270°.

3) 270°
x 4
1080°

4) 170°
x 2
340°

5) 16°
x 6
96°

6) 198° 10'
x 4
792°40'

7) 199° 30'
x 2
399°

8) 121° 45'
x 4
487°

9) 166° 5'
x 3
498°15'

10) 127° 55'
x 8
1023°20'

11) 90° 15'
x 5
451°15'

12) 180° 30'
x 3
541°30'

[illegible]

Drill

Subtract:

1) 178°
- 42°

136°

2) 236°
-188°

48°

3) 197°
-114°

83°

4) 167°
- 14°

153°

5) 78°
-10°

68°

6) 30° 15'
- 12° 6'

18°9'

7) 40° 15'
- 16° 19'

23°56'

8) 60° 14'
-15° 21'

44°53'

9) 60° 12'
- 14° 32'

45°40'

10) 69° 12'
- 14° 57'

54°15'

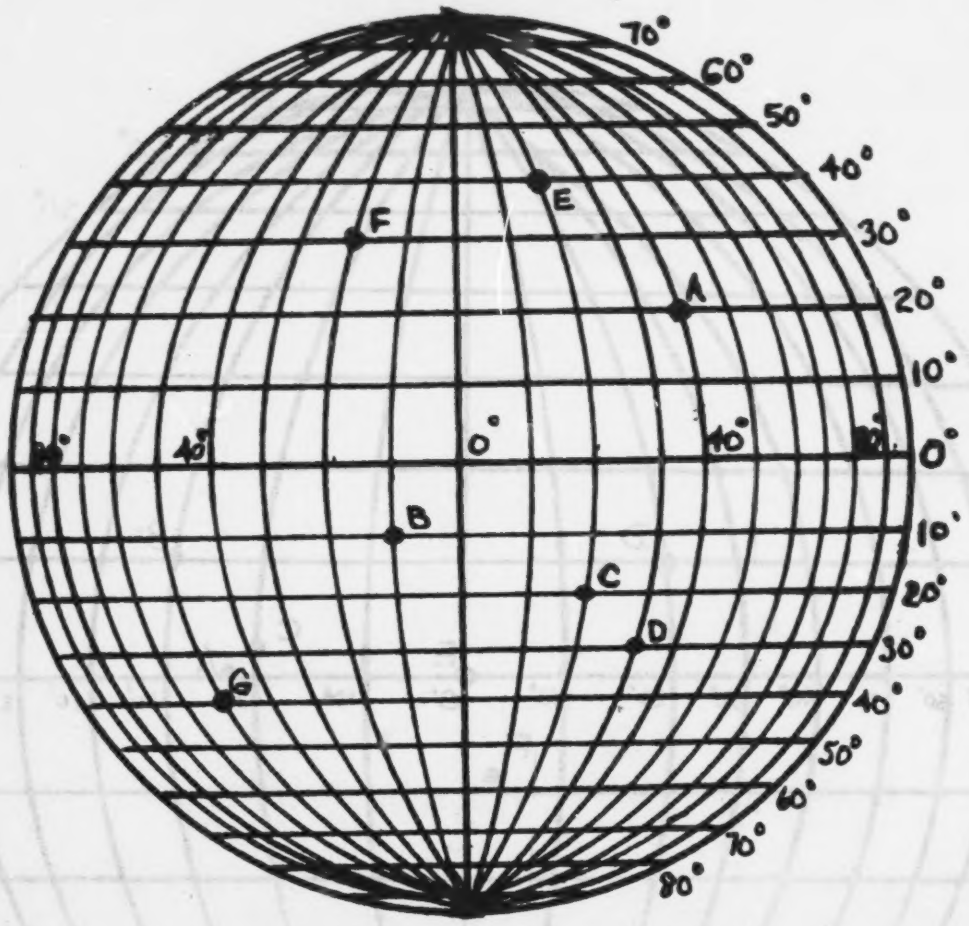
11) 70° 15'
- 30° 45'

39°30'

12) 180° 00'
- 65° 30°

114°30'

Latitude and Longitude on the Moon



If we look at the moon as we do at a globe of the earth, the central east-west line is the "equator". Parallels of latitude are marked from 0° at the equator north to 90° and south to 90° at the "south pole". From zero, at the very center of the moon, meridians go to the right (Eastward) to 90°, and westward (left) to 90°.

Example: Find Latitude and Longitude of Point A

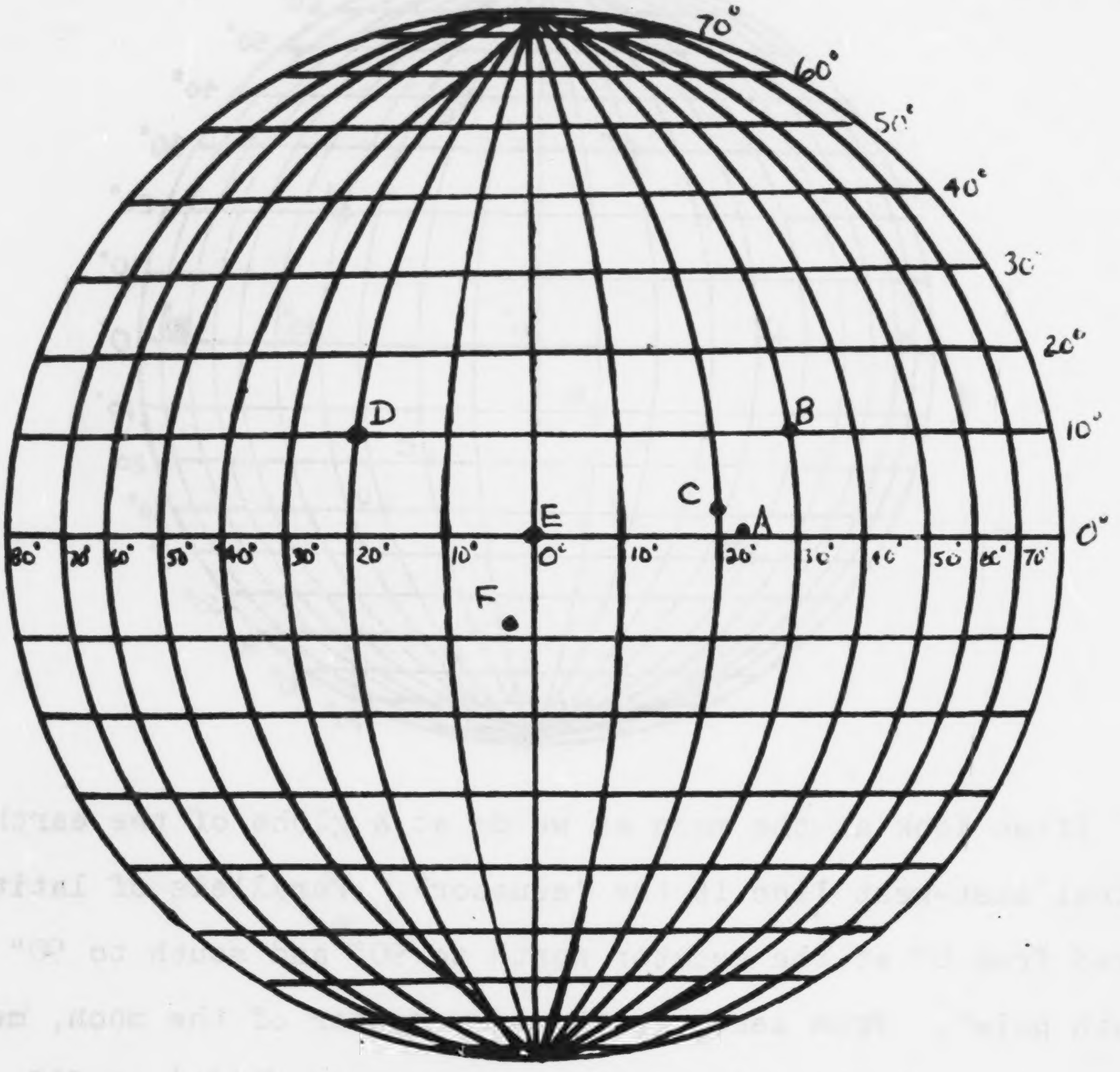
Answer: Latitude 20° North

Longitude 40° East

Find the Latitude and Longitude of these points on the Moon.

1) B, Lat 10°S, Long 10°W
2) C, Lat 20°S, Long 20°E
3) D, Lat 30°S, Long 30°E
4) E, Lat 40°N, Long 20°E
5) F, Lat 30°N, Long 20°W
6) G, Lat 40°S, Long 50°W

MAN ON THE MOON. JULY 20, 1969


70°
60°
50°
40°
30°
20°
10°
0°
80°
70°
60°
50°
40°
30°
20°
10°
0°
10°
20°
30°
40°
50°
60°
70°
D
B
C
A
E
F

LANDMARKS FOR THE ASTRONAUTS

Find The Latitude and Longitude of these places

A Landing Place, Lat 1°N, Long 23°E.

B Sea of Tranquility, Lat 10°N, Long 30°E.

C Sabine, Lat 3°N, Long 20°E.

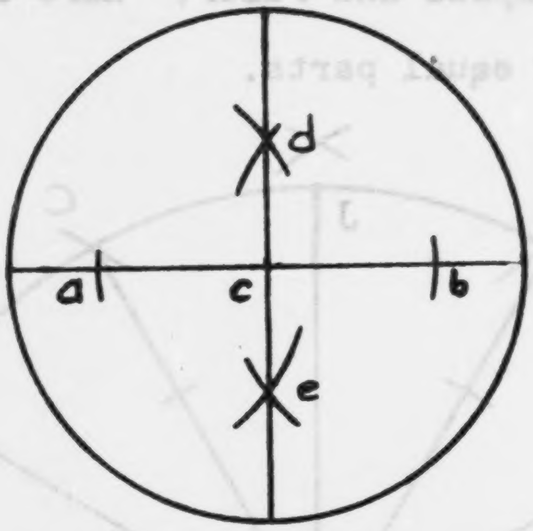
D Copernicus, Lat. 10°N, Long 20°W.

E Central Bay, Lat 0°, Long 0°

F Ptolomaeus, Lat 8°S, Long 3°W.

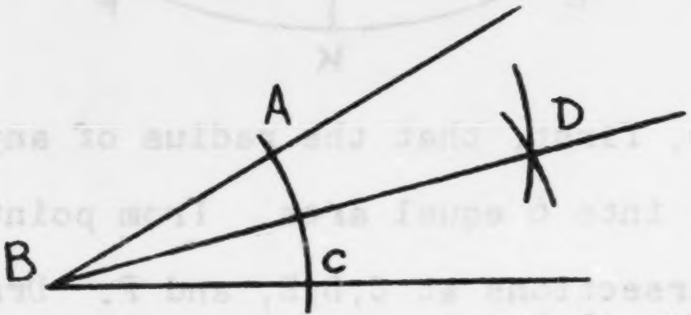
Constructions Basic To Designs

If a student can construct a perpendicular (90° angle) at a point on a line, he can easily divide a circle into four equal parts.



On the diameter of the circle find point C, the center. Use any radius to draw arcs a and b. Use any larger radius and with the needle at point C, draw intersecting arcs at d and e. Draw a long straight line through d and e. This line divids the circle into four equal parts called quadrants.

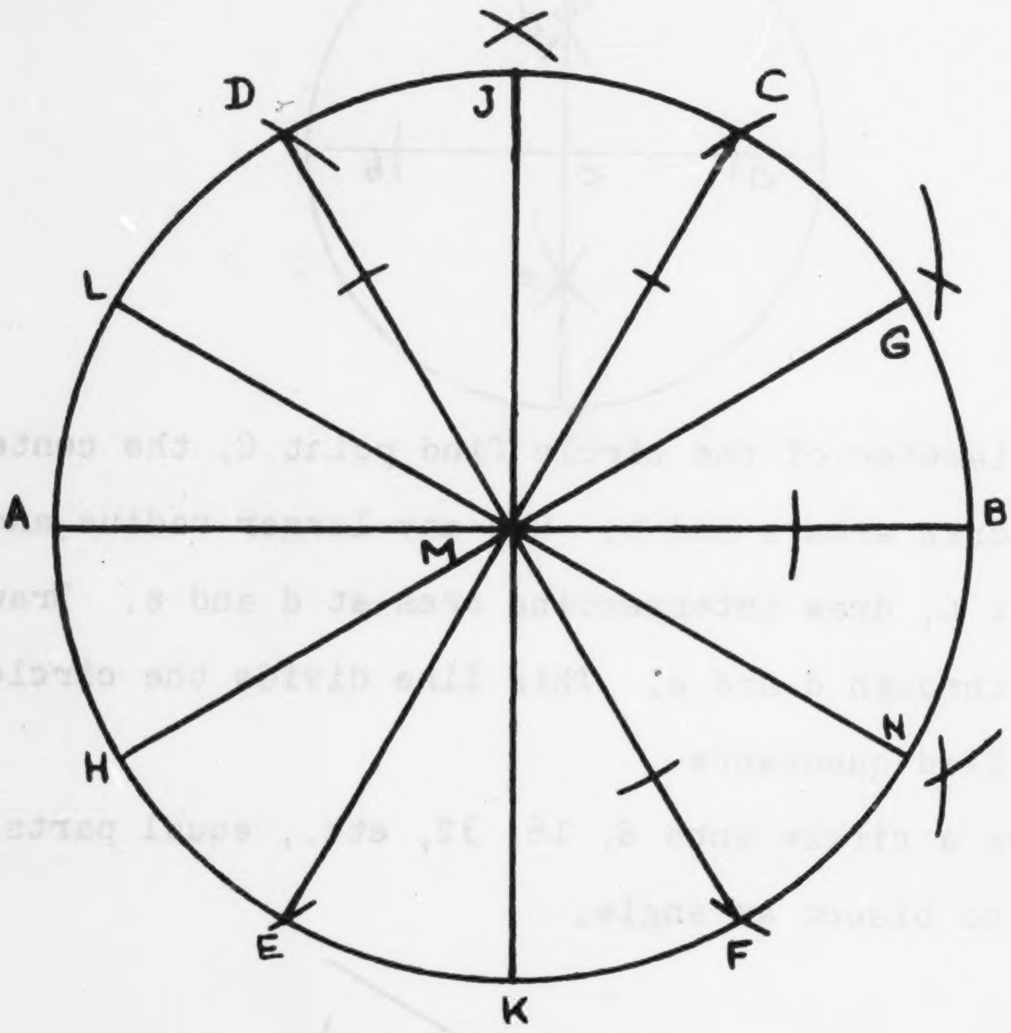
To divide a circle into 8, 16, 32, etc., equal parts, a student must know how to bisect an angle.



Draw an arc of any radius using point B for the needle, and intersecting the sides of the angle at A and C. Now put the needle at A and C and draw intersecting arcs at D. The line BD divides angle ABC into 2 equal parts.

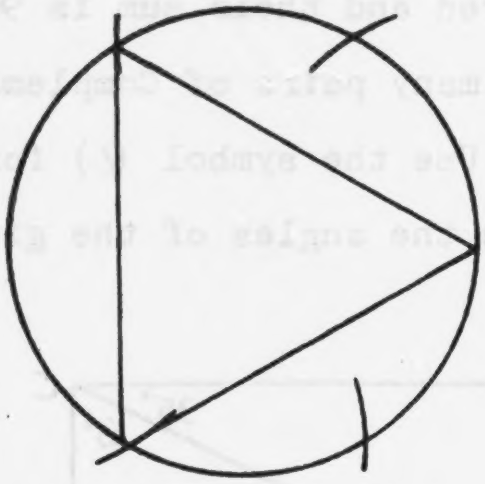
Some Designs

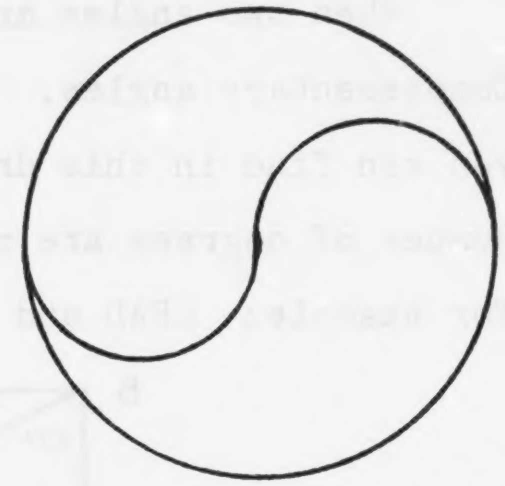
Good designs are not made by accident. Care must be exercised in measuring and using campass and ruler. Here is an experiment in dividing a circle into 12 equal parts.

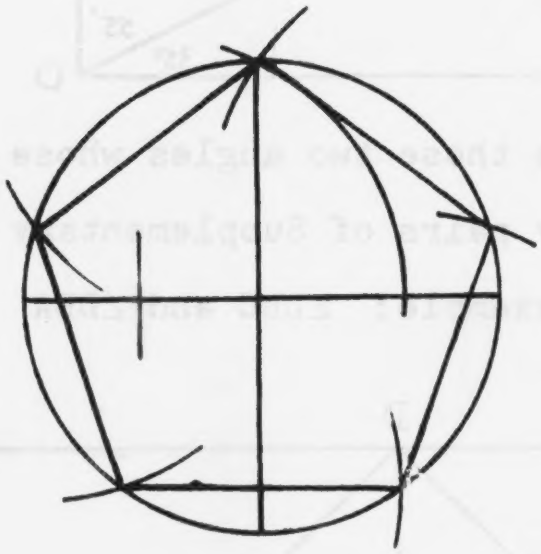


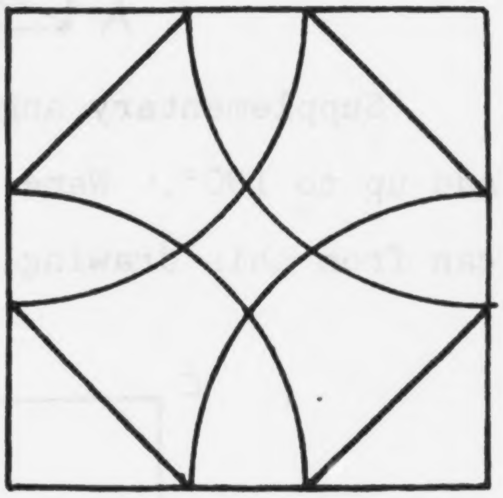
You must know, first, that the radius of any circle can be used to mark off the circle into 6 equal arcs. From points A and B on the diameter, find intersections at C, D, E, and F. Draw lines CE and DF. By the construction method, see previous page, bisect angle CMB, and draw line GH. In like manner, bisect the next two angles and draw lines JK and Ln. Try coloring each of the 12 parts with water-color or crayon.

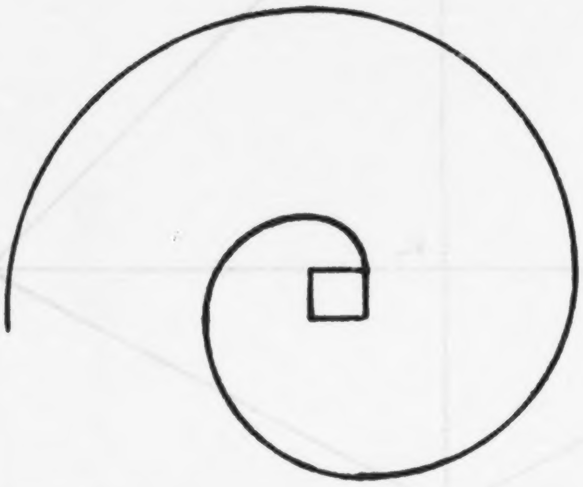
SUGGESTED DESIGNS

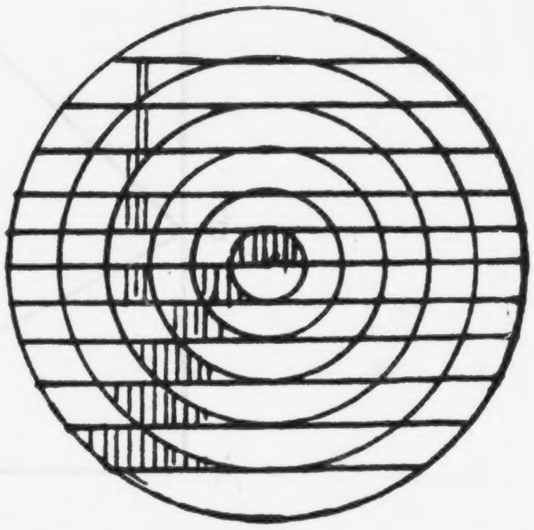






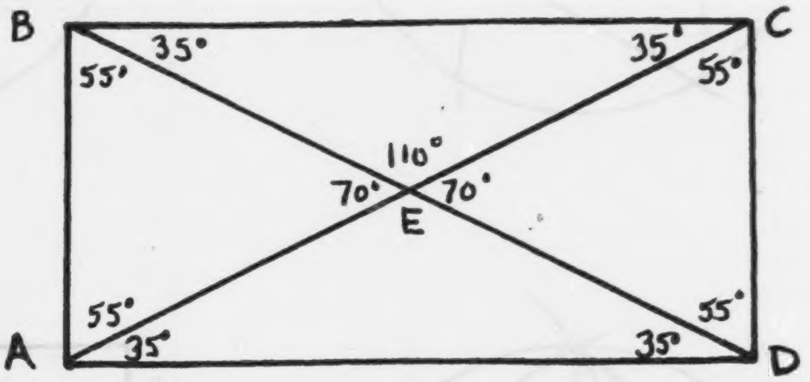




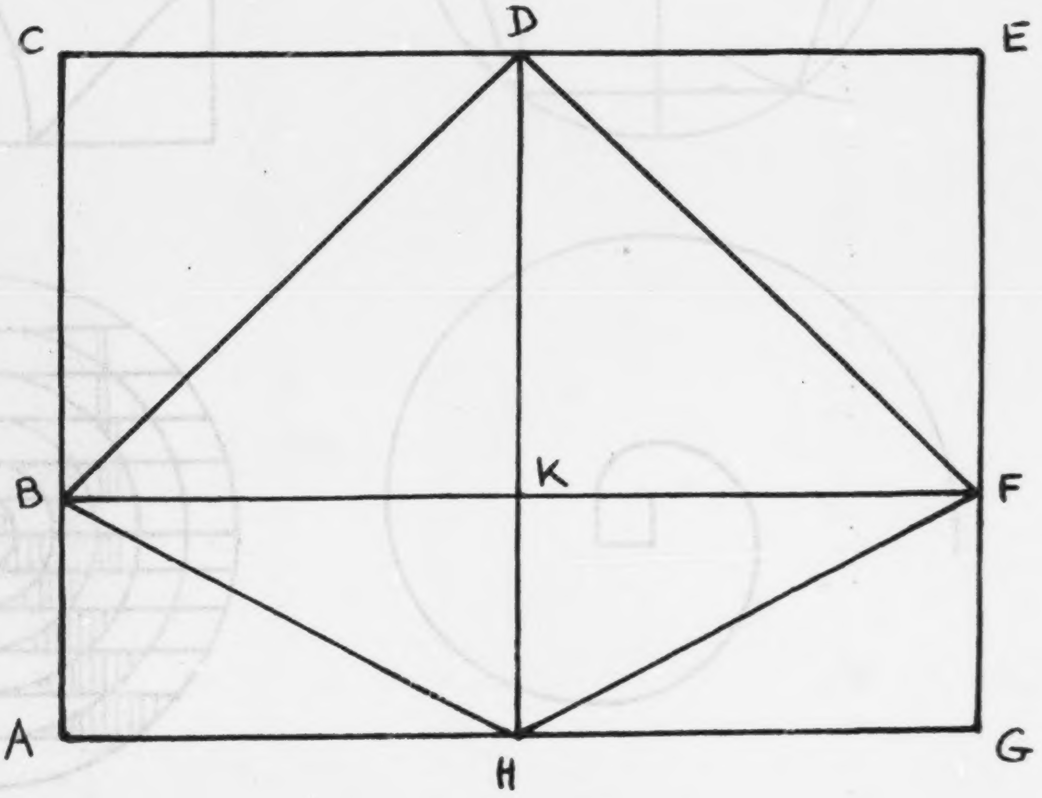


Special Pairs of Angles

When two angles are measured and their sum is 90° we call them Complementary angles. List as many pairs of Complementary angles as you can find in this drawing. Use the symbol (∠) for angle. The number of degrees are marked in the angles of the given figure. For example: ∠EAD and ∠EAB

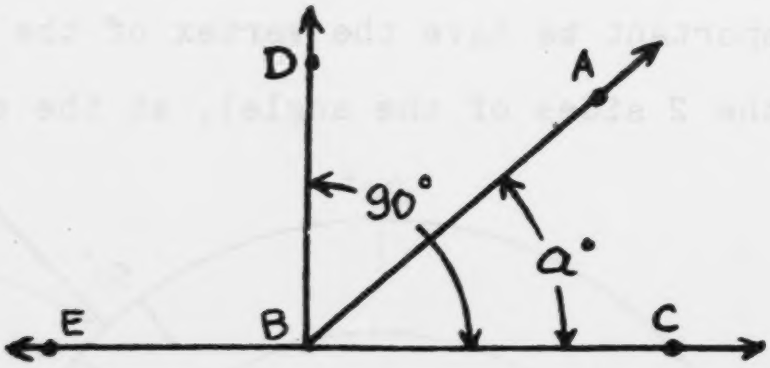


Supplementary angles are those two angles whose measure in degrees add up to 180°. Name as many pairs of Supplementary angles as you can from this drawing. For example: ∠DBC and ∠DBA



Angles

Study this diagram and see if you can complete the sentences below. Use letters from the diagram.



1) Angle DBC which is 90° is also called a right angle.

2) Angle ABC is also called by a letter a

3) An acute angle in the drawing is ∠ABC

4) Another name for a line like BA is ray

5) 90° makes line DB perpendicular to line BC (also, at right angles)

6) Because angles DBA plus angle ABC equal 90° the pair of angles are said to be complementary

7) Angle DBC could be measured with a protractor

8) Angle DBC plus angle DBE must equal 180°

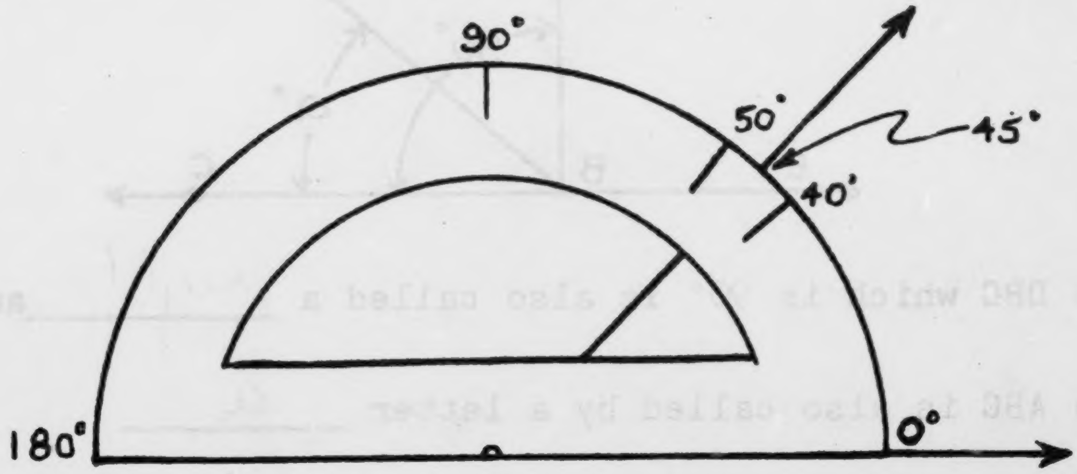
9) The pair of angles in problem 8 are supplementary

10) Name 3 angles which add up to 180° ∠ABC, ∠DBA, ∠DBE

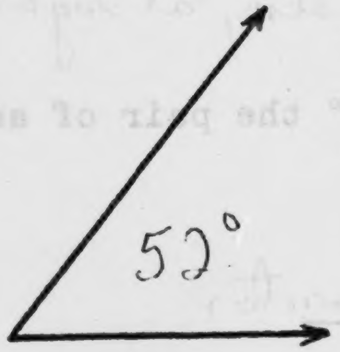
ditto available

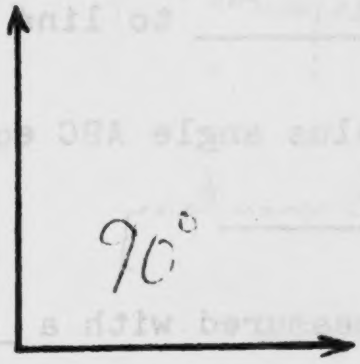
Using a Protractor

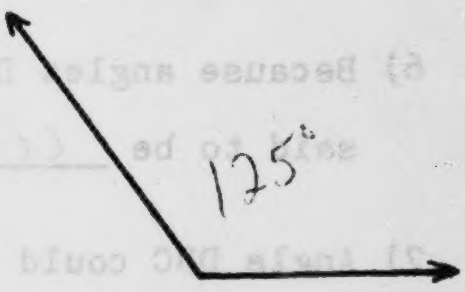
If a circle is divided into 360 equal parts, we can call any one part a degree. Protractors are usually shaped as half a circle, or 180°. It is very important to have the vertex of the angle (the point of intersection of the 2 sides of the angle), at the correct point on the protractor.

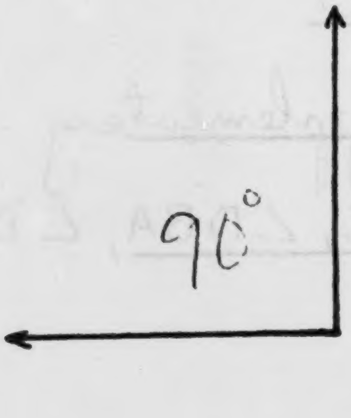


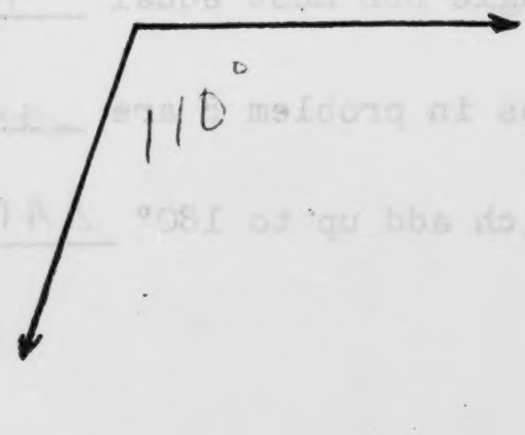
Measure the number of degrees in each angle. Take the results and lay out the same 6 angles on a separate piece of paper. When finished, cut your 6 angles out with scissors and match them with these.

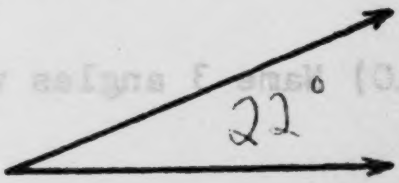












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Practice Work

Add:

1) 52°
98°
150°

2) 47°
42°
19°
108°

3) 16°
42°
58°

4) 15°
120°
19°
154°

5) 15°
22°
99°
136°

6) 200°
98°
14°
312°

7) 62°
71°
133°

8) 98°
172°
14°
284°

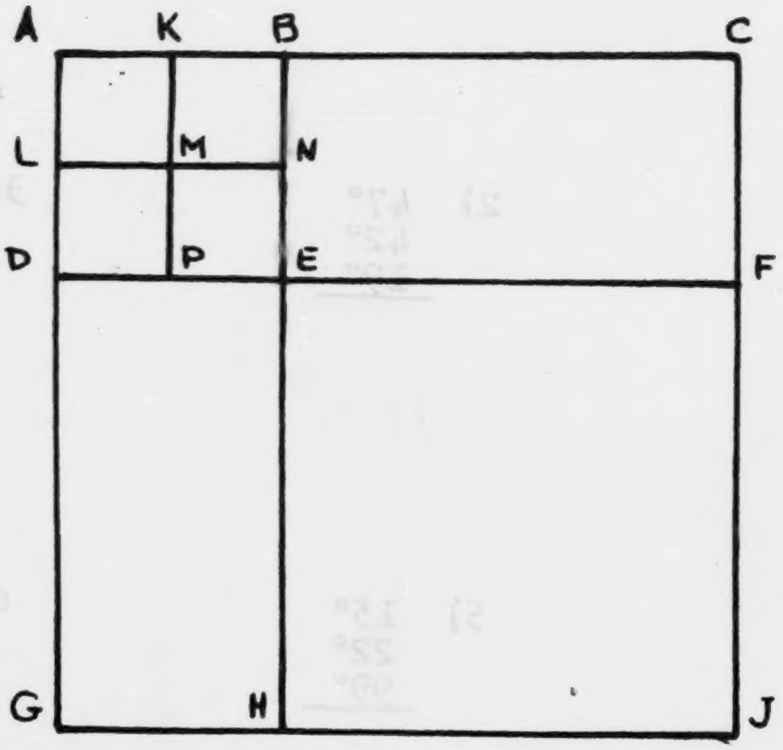
9) 14°
12°
188°
79°
293°

10) 14°
79°
97°
190°

11) 136°
121°
210°
467°

12) 218°
310°
312°
840°

Lines Intersecting At Right Angles



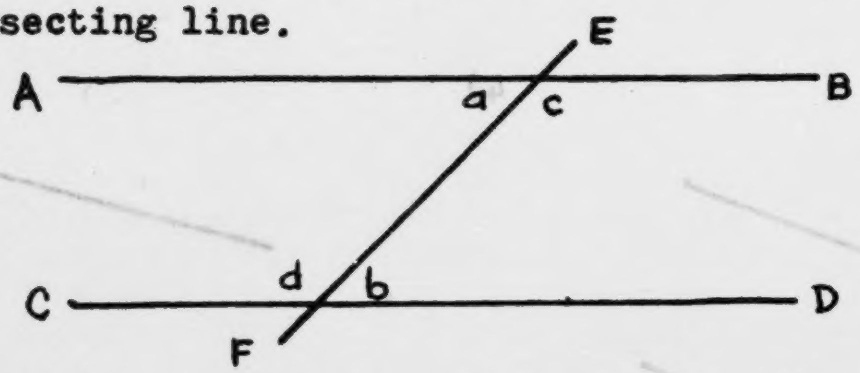
All about us are right angles. Squares and rectangles each have four right angles. Squares have four equal sides; only the opposite sides of rectangles are equal.

In the above drawing see if you can find at least seven squares. Some may overlap. List them like this: AKML, KBNM, etc.

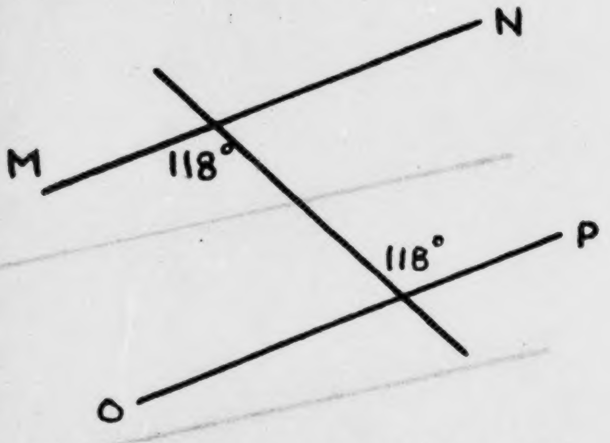
List at least ten rectangles which can be found in the drawing.

Testing To See If Lines Are Parallel

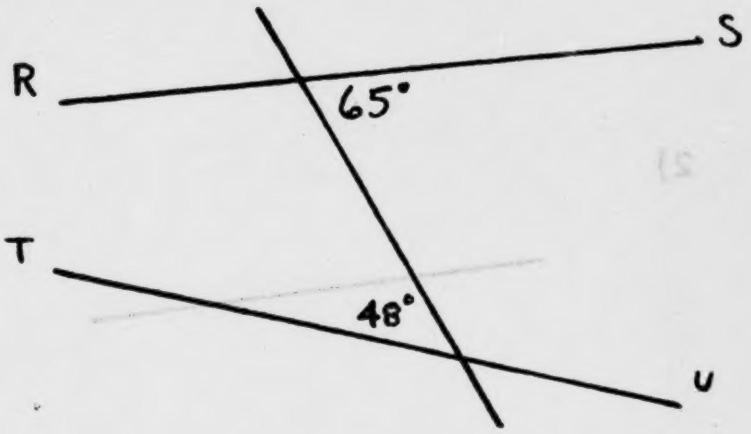
One way to see if any two lines are parallel is to see if certain angles are equal. It is a fact that if two lines are parallel, then certain angles are equal. In the drawing, line AB and Cd are parallel. EF in any intersecting line.



Therefore, ∠a must equal ∠b, and ∠c must equal ∠d. To test to see if any two lines are parallel we measure these angles and compare them. Remember measurement is approximate and our conclusion is based on careful work.



In the above drawing the angles measure equal, so we conclude that MN and OP are parallel.



Here the angles measure unequally, so we conclude that RS and TU are not parallel.

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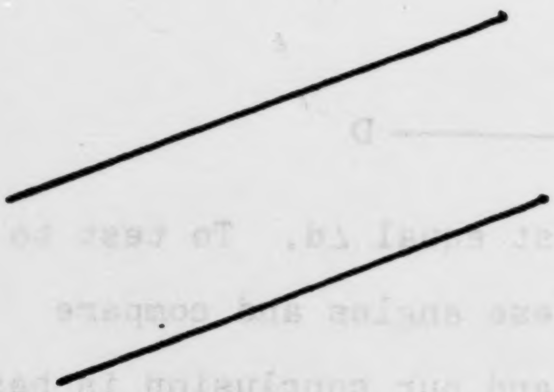
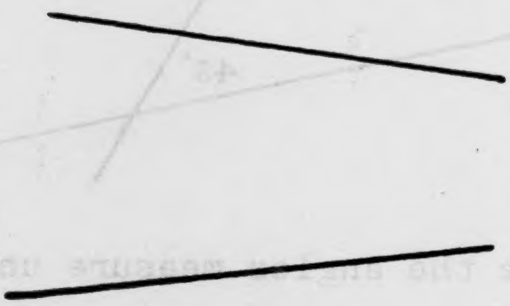
Practice With Testing Parallel Lines

See the previous page for instruction on how to test to see if lines are parallel. Measure the angles with a protractor. Write under each drawing either Parallel, or Not Parallel.

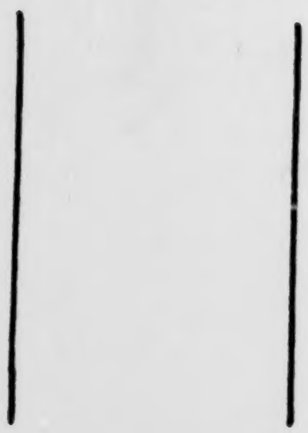
1)



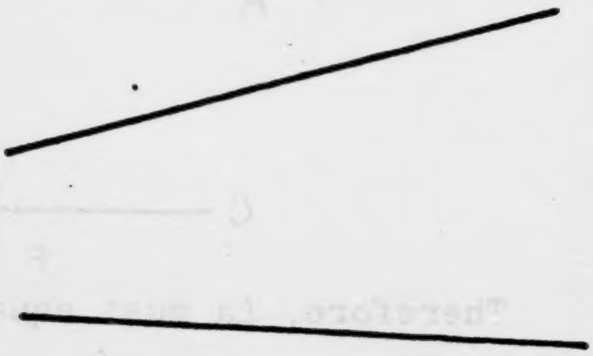
2)



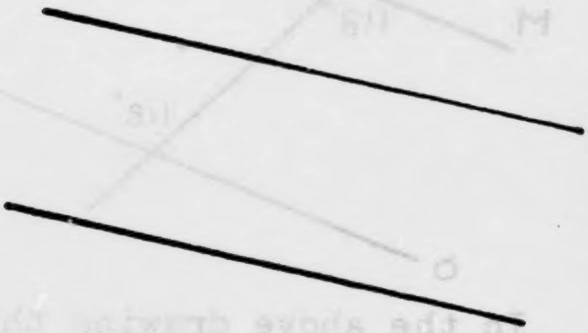
3)



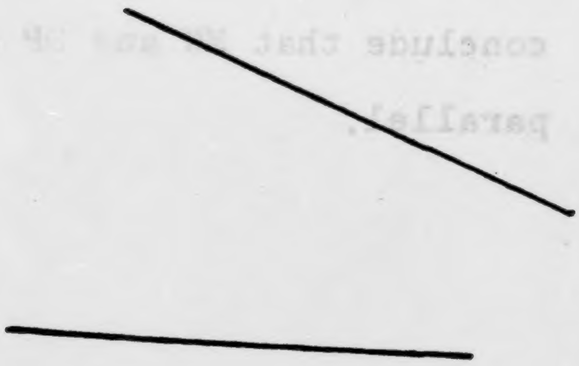
4)



5)

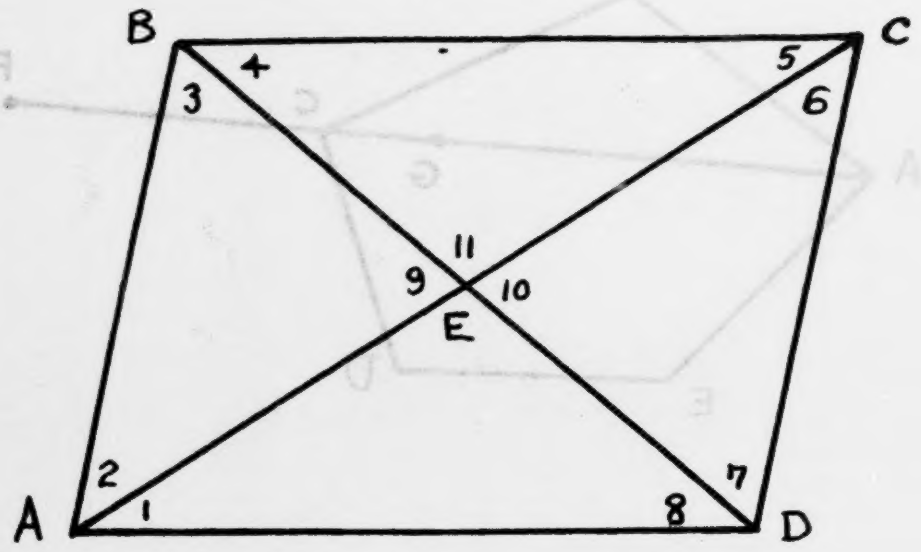


6)



Something About Parallelograms

Parallelograms are four sided figures with opposite sides equal and parallel. Use a ruler and a protractor on this drawing and "prove" by measurement if the sentences are True or False. Measurement is approximate, so work carefully.



1) BC = AD True

2) ∠BAD = ∠BCD True

3) ∠ADC = ∠BCD False

4) BE = ED True

5) CD = BA True

6) ∠5 = ∠6 False

7) ∠ABC = ∠ADC True

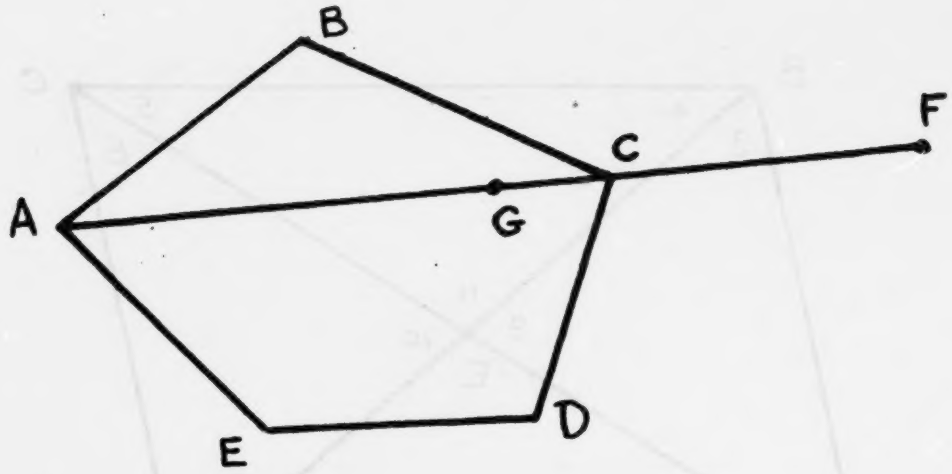
8) ∠9 = ∠10 True

9) ∠1 = ∠5 True

10) ∠10 + ∠11 = 180° True

Polygons

A polygon is a flat figure with many sides. Triangles, squares, hexagons, are examples of polygons. The drawing shows a pentagon, one of its diagonals, and the same diagonal extended to point F. Most of these answers you can guess; also use a dictionary for difficult words.



1) Name the sides of this polygon. (such as AE, ED, etc.)

2) Name the polygons five interior angles. $\angle BAE$, $\angle AED$, etc

3) Name one exterior angle. (of the polygon. Such as $\angle AED$, etc.)

4) Name an exterior point. Point F

5) Name and interior point. Point G

6) Name a triangle. $\triangle ABC$

7) Name a vertex. $\angle EDC$, etc

8) Name a quadrilateral (four sided figure). Quadrilateral ACDE

9) Name all the angles around point C. $\angle BCA$, $\angle ACD$, $\angle DCF$, $\angle FCB$

10) Name two supplementary angles. $\angle BCF$ and $\angle BCA$

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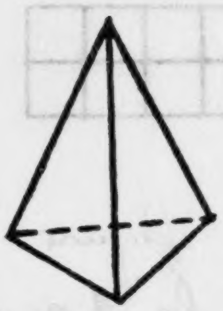
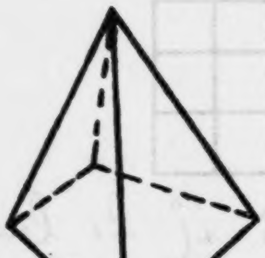
Space Figures

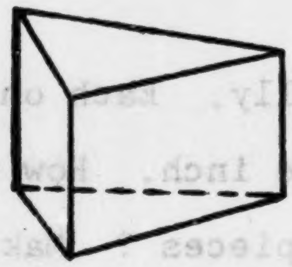
Polyhedrons are solid figures with many faces. Study the drawing of the first figure in this series and see if you can explain why polyhedrons must have at least four sides.

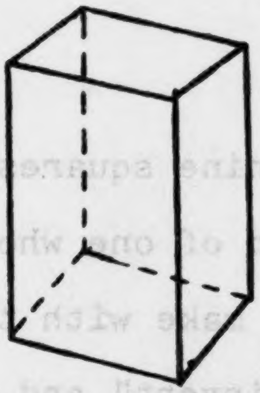




Can you draw the next one ?

Prisms are polyhedrons with two faces parallel such as the rectangular solid (second figure in this series)

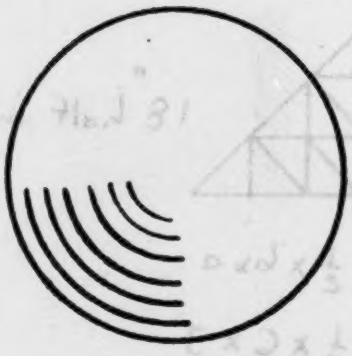


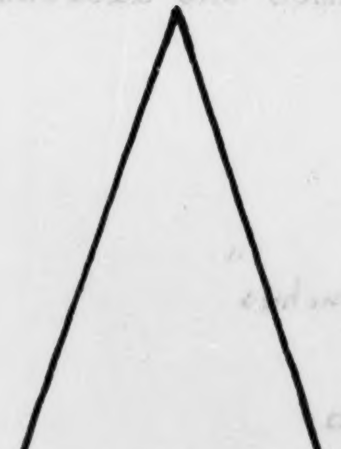


Can you draw the next one ?

Some space figures with curved surfaces are drawn here.

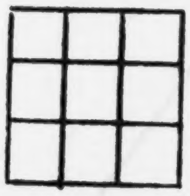
Can you draw some more ?

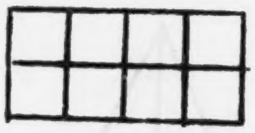




Area Problems In Reverse

With scissors cut out 9 pieces of paper exactly one inch square. How many rectangular figures can you make with some or all of these nine pieces ? Here are some suggested.

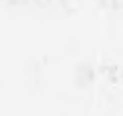




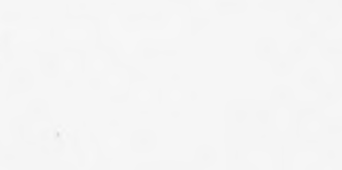
(The student should see that if he builds a figure with 4 square inches the area, regardless of shape, has to be 4 square inches.)

Make a drawing of each figure you "invent". The number of squares you use will be the area, in square inches, of that figure.

Now cut each of these nine squares diagonally. Each one now is one half square inch instead of one whole square inch. How many different triangles can you make with these 18 pieces ? Make a drawing of each figure in "invent" and put the area in square inches under it. Check your results with the formula: Area of a triangle is one half the base times the altitude.



$$\text{Area} = \tfrac{1}{2} \times b \times a$$
$$= \tfrac{1}{2} \times 2 \times 2$$
$$= 2\square''$$



$$\text{Area} = \tfrac{1}{2} \times b \times a$$
$$= \tfrac{1}{2} \times 6 \times 3$$
$$= 9\square''$$

Adding Whole Numbers and Decimals

1) 118
4382
165
4998
315

9978

2) 679
4836
298
4362
8741

18.916

3) 482
3146
809
6483

10920

4) 672
4376
802

5850

5) 698
437
1628

2763

6) 168.34
25.61
49.87
632.84
19.08

895.74

7) 19.805
4.632
19.803
.216
3.811

48.267

8) 26.25
2.09
21.90
6.03

56.27

9) 6.032
7.604
18.032

31.668

10) 8.04
19.08

27.12

Practice With Subtraction

1) 638452
- 52007

586445

2) 654378
- 62904

591474

3) 57604
- 38910

18694

4) 64387
- 21096

43291

5) 819805
- 198032

621773

6) 634.003
- 5.009

628.994

7) 63.097
- 41.803

21.294

8) 986.62
-63.84

922.78

9) 9087.60
- 8543.02

544.58

10) 89017.6
- 9071.8

79945.8

[illegible]

Whole Number and Decimal Multiplication

1) 236
451

106436

2) 207
415

85905

3) 362
801

289962

4) 763
208

158704

5) 614
392

240688

6) 1.05
3.2

3.36

7) 2.34
1.14

2.6676

8) 6.32
2.1

13.272

9) 7.09
8.2

54.138

10) 6.72
5.6

37.632

[illegible]
available

Divide and Reduce Remainder

1) 23)4156

$180\frac{16}{23}$

2) 62)8724

$140\frac{22}{31}$

3) 16)1783

$111\frac{7}{16}$

4) 12)980

$81\frac{2}{3}$

5) 18)3608

$200\frac{4}{9}$

6) 3)19803

6601

7) 15)16070

$1071\frac{1}{3}$

8) 12)14080

$1173\frac{1}{3}$

9) 16)19845

$1240\frac{5}{16}$

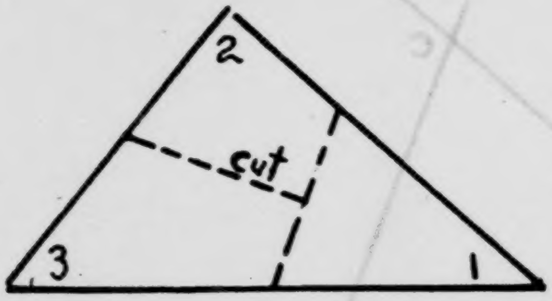
10) 30)663062

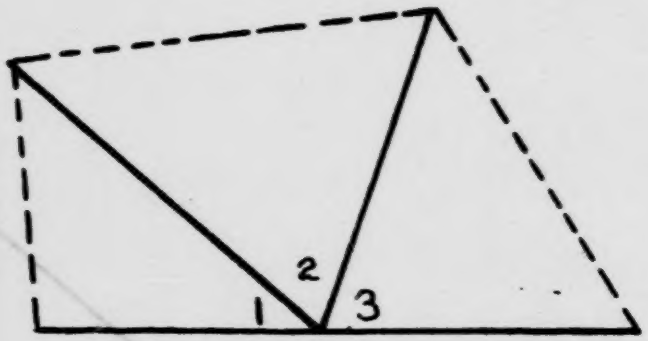
$22102\frac{1}{15}$

A Fact About Triangles

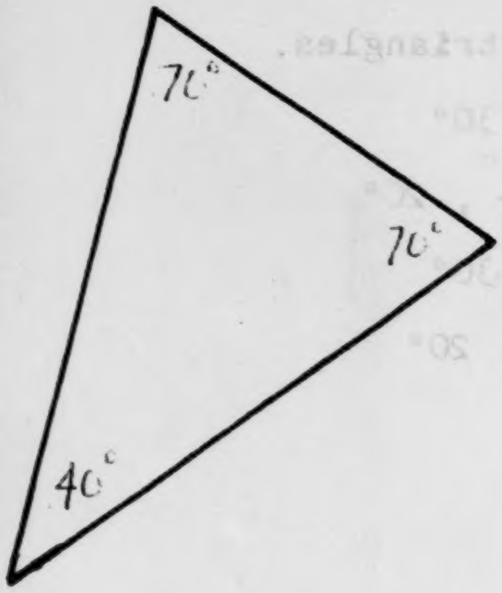
Draw several triangles of different shape. Place numbers from one to nine in the nine angles. Now cut off three angles of each triangle. Spread out angles 1, 2, and 3, adjacent to each other. What do you notice when you put together 4, 5, 6, and 7, 8, 9 ?

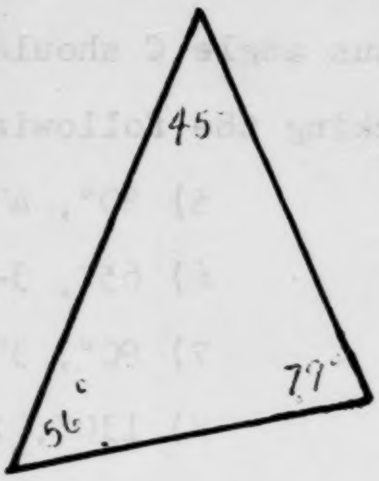
Illustration.

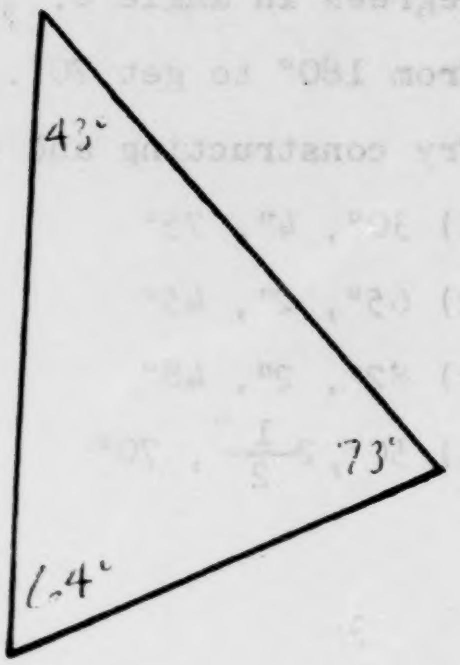




Use your protractor and measure the number of degrees in each of these triangles. Find the sum of these angles for each triangle. Can you establish the fact that this sum for any triangle should be 180° ?

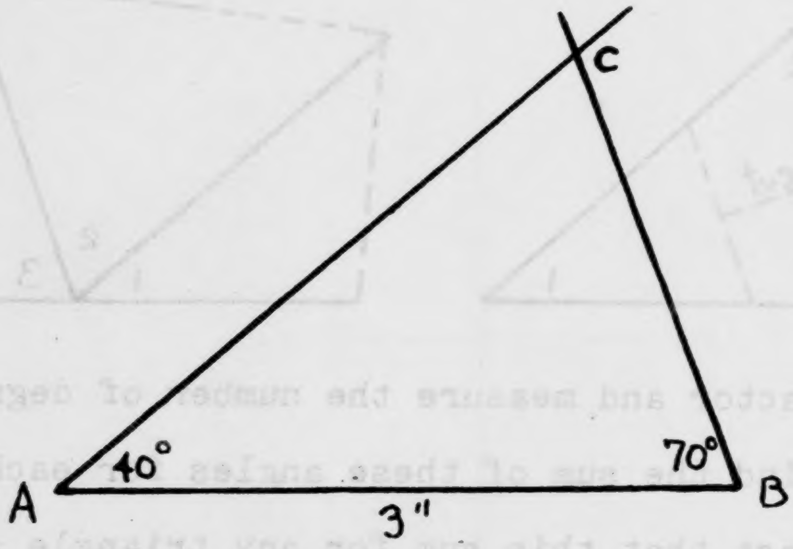






Angle, Side, Angle

Sometimes it is necessary to construct a triangle when two angles and the side between them is given. For example, let us construct a triangle given the information in this way: 40°, 3", 70°. Draw a line, AB, which measures 3". Next, with the protractor construct angles of 40° and 70° at points A and B. Extend these sides until they meet at point C.



A check to see if you have done it correctly is to measure the degrees in angle C. Adding 40° and 70° gives 110°. Subtract 110° from 180° to get 70°. Thus angle C should measure 70°.

Try constructing and checking the following triangles.

1) 30°, 4", 75°
2) 65°, 2", 45°
3) 82°, 2", 48°
4) 50°, $2\frac{1}{2}$", 70°
5) 80°, 4", 30°
6) 65°, $3\frac{1}{2}$", 20°
7) 90°, 3", 30°
8) 130°, 2", 20°

Lillie

Division of Degrees and Minutes

1) $5\overline{)45^\circ}$

9°

2) $4\overline{)90^\circ}$

$22\frac{1}{2}^\circ$

3) $7\overline{)99^\circ}$

$14\frac{1}{7}^\circ$

4) $6\overline{)39^\circ}$

$6\frac{1}{2}^\circ$

5) $16\overline{)262^\circ}$

$16\frac{3}{8}^\circ$

6) $4\overline{)60^\circ\ 30'}$

$15^\circ\ 7\frac{1}{2}'$

7) $5\overline{)75^\circ\ 15'}$

$15^\circ\ 3'$

8) $4\overline{)65^\circ\ 30'}$

$16^\circ\ 22\frac{1}{2}'$

9) $6\overline{)37^\circ\ 15'}$

$6^\circ\ 12\frac{1}{2}'$

10) $9\overline{)100^\circ\ 26'}$

$11^\circ\ 9\frac{5}{9}'$

11) $3\overline{)90^\circ\ 30'}$

$30^\circ\ 10'$

12) $12\overline{)350^\circ\ 30'}$

$29^\circ\ 12\frac{1}{2}'$

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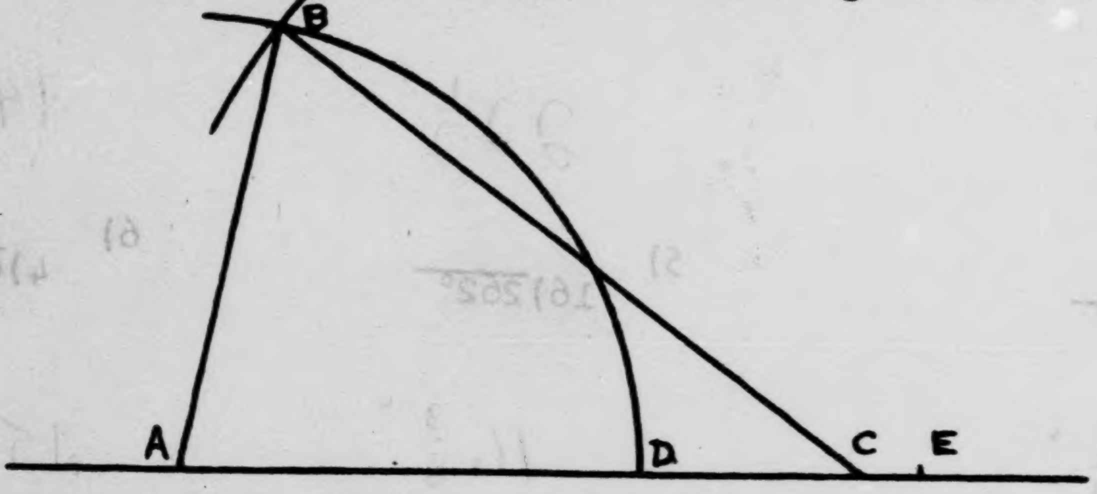
Side, Side, Side

A compass is essential if one is going to construct a triangle when only the lengths of the three sides are given. Suppose we wish to construct a triangle with the lengths of sides given as: 2", 3", $3\frac{1}{4}''$.



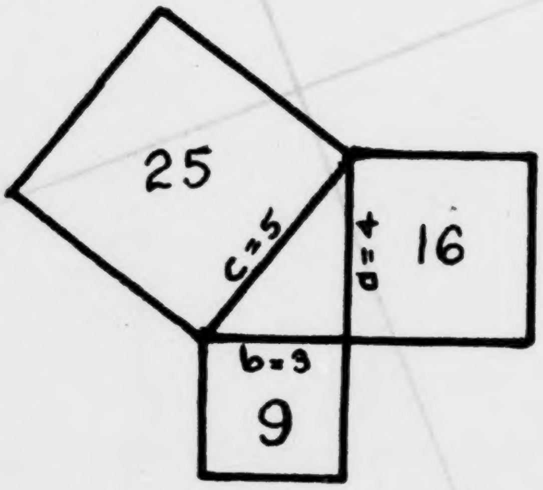
Lay out a long base line MN. Choose some point A and measure the three lengths on the base line with a ruler. Thus, AD = 2", AC = 3", and AB = $3\frac{1}{4}''$. Put the compass needle at A and swing a 2" arc from point D. Place the compass needle at C and swing a $3\frac{1}{4}''$ arc until it intersects the other arc. Call the point of intersection B, and draw BA and BC. Check you work by measuring the angles with a Protractor and comparing results with the work of the teacher, or another student.

Construct the following triangles for practice:

1) $3\frac{1}{2}''$, 3 , $2\frac{1}{2}$	4) 4", 8", 6"
2) 5", 4", 3",	5) 3", 3", 3"
3) 4", 2", 3"	6) 4", 4", 2"

Rule of Pythagoras

The wise men Pythagoras lived more than 2000 years ago but his theorem has affected mathematics to this day. The theorem states that square on the hypotenuse of a right triangle is equal in area to the sum of the area of the squares on the other two legs. You can see this fact by figuring the area of these squares on a triangle the sides of which are 3", 4", and 5".



Not only does 16 + 9 = 25, but a relationship between the sides of a right triangle is established, $a^2 + b^2 = c^2$. Knowing any two of these variables it is possible to find the third one.

For example, in the above triangle a and c might be 6 and 10.

$$a^2 + b^2 = c^2$$

$$6^2 + b^2 = 10^2$$

$$36 + b^2 = 100$$

If the side b, squared, is 64, then b itself must be 8. It may be necessary for you to review squares and square root. Try these problems.

1) $a = 5$, $b = 12$, Find c

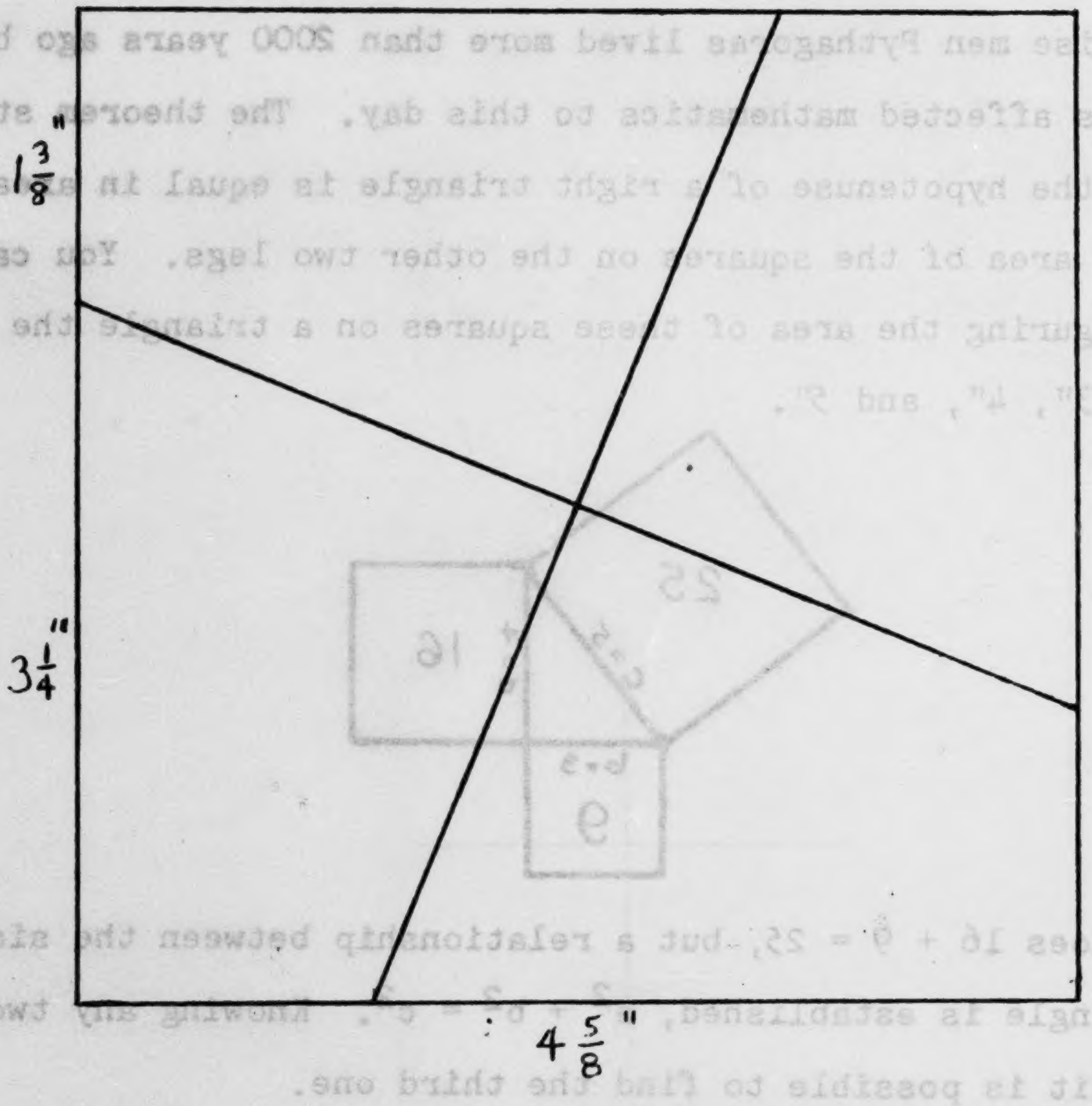
2) Find a, $b = 15$, $c = 17$

3) $a = 15$, $b = 20$, Find c

4) $a = 30$, Find b, $c = 50$

ditto
available

A PUZZLE FOR GEOMETERS



The above puzzle is related to the Pythagorean theorem. Cut out the pieces carefully, and try forming a new square with a rearrangement of the pieces. If the square shown above is the square on one leg of a right triangle, and the new square is the square on the hypotenuse, what relationship appears between the new square and the other leg ?

POOR ORIGINAL COPY - BEST
AVAILABLE AT TIME FILMED

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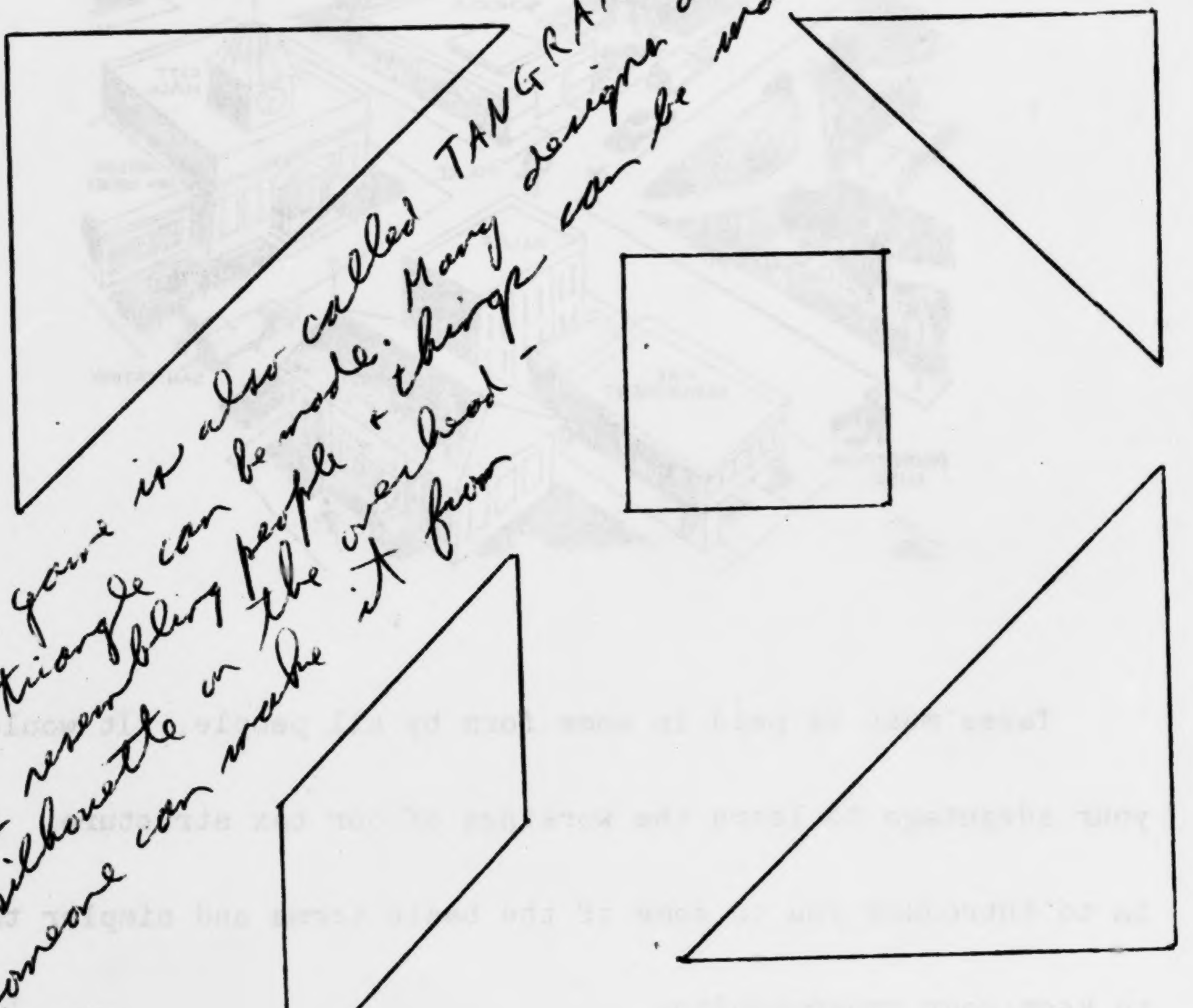
slide available

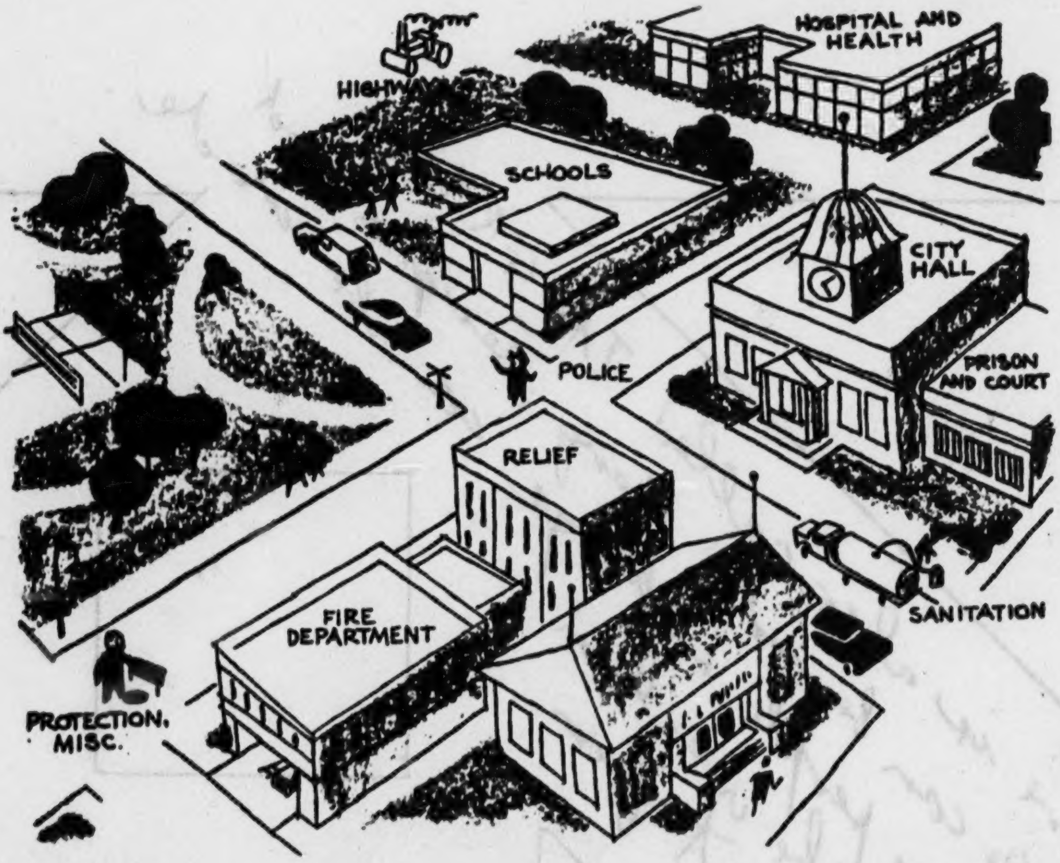
CUT OUT THESE PIECES. THEY DO MAKE A SQUARE!



This game is also called TANGRAMS
a right triangle can be made. Many designs and
shapes resembling people + things can be made.
Put the silhouette on the overhead -
see if someone can make it from
his pieces.

TAXES

UNIT V


HIGHWAY
HOSPITAL AND HEALTH
SCHOOLS
CITY HALL
POLICE
PRISON AND COURT
RELIEF
FIRE DEPARTMENT
SANITATION
PROTECTION, MISC.

Taxes must be paid in some form by all people. It would be to your advantage to learn the workings of our tax structure. Our intent is to introduce you to some of the basic terms and simpler tax problems to keep your understanding.

In the picture above, you will see many things which are supported by your tax dollars.

DO YOU REMEMBER?

1) Do the indicated operations:

a) $4070
+ 937
$5007

b) $6024.75
+ 297.36
$6322.11

c) $18.73
- 6.94
$11.79

d) $4129.72
- 238.79
$3890.93

e) $400.72
x .045
$18.032240

f) $4000
x 6.2
$1123\frac{1}{13}$

g) 66
.065) 73.

h) 66
.06) 3.96

2) a) Change 7% to .07 (decimal)

b) Change 6.5% to .065 (decimal)

c) Change .045 to 4.5 (%)

d) Change .124 to 12.4 (%)

3) What is 8% of 240?

4) Using p = r b

a) What is p, if r = 7%, and b = $2400 $168

b) What is b, if p = 240, and r = 6% 4000

c) What is r, if p = $300, and b = 750 400

5) Name one of each kind of tax

a) Federal (U.S.) tax

b) State (Delaware) tax

c) County (New Castle) tax

d) City (Wilmington) tax

LET'S GET SOME PRACTICE

1) Do the indicated operations:

a) $7047 + 394 = #7441

b) $8049.69 + 254.37 = #8304.06

c) $19.84 - 6.75 = #13.09

d) $6129.43 - 554.97 = #5574.46

e) $300.24 x .065 = #19.51560

f) $3000 x 5.4 = #16200.0

g) .056)45.752 = 817

h) .09).08163 = .907

2) a) Change 8% to .08 (decimal)

b) Change .037 to 3.7 (%)

c) Change 6.5% to .065 (decimal)

d) Change .124 to 12.4 ($)

3) What is 7.5% of 240?

4) Using p = rb

a) What is p, if r = 5%, and b = $2400 #120

b) What is b, if p = $360, and r = 5.5% #19.80

c) What is r, if p = $400, and b = $2000 20%

5) What is the purpose of taxation?

6) Change to nearest cents

a) $4067.823 = #4067.82

b) $337.964 = #337.96

c) $499.996 = #500

d) $30.62499 = #30.62

LET'S GET SOME PRACTICE

1) Do indicated operations:

a) $5418 +1725 $7143	b) $921.73 + 40.88 $962.61	c) $22.34 - 5.62 $16.72	d) $8135.86 -6085.29 $2050.57
e) $500.76 x .047 $23.53572	f) $6000 x 7.5 $45000.0	g) 32.8 .043)1.4104	h) 80.7 .09)7.263

2) a) Change 6.4% to .064 decimal

b) Change $8\frac{1}{2}$% to .085 decimal

c) Change .043 to 4.3 (%)

d) Change .125 to 12.5 (%)

3) What is 6.8% of 924?

4) Using p = rb

a) What is p, if r = 6.7% and b = $2143 143.581

b) What is b, if p = $134 and r = 5% 2680

c) What is r if p = $328 and b = 14.760 22%

5) Change these to nearest cent

a) $3172.546 = $3172.55

b) $3.045 = $3.05

c) $79.998 = $80

d) $40.6345 = $40.63

LET'S CHECK OUR TAX VOCABULARY

Taxes

Direct tax

Property tax

Real property

Personal property

Income tax

State tax

Federal tax

Indirect tax

Market value

Assessed value

Assessor

Rate

Let's go over this list to see what we know now. At the end of the chapter let's review again to see what we have learned

TAXES

Taxes are a source of income for a certain government - federal, stae, county, or city. They provide money for services to you. These services may be sidewalks, parks, police and fire protection, schools, and many others.

Indirect Taxes

Indirect taxes, sometimes called "hidden" taxes, are included in the purchase price of the article. It is a certain percent of the purchase price. This percent is called the tax rate.

A few of the indirect taxes are a sales tax, a gas tax, a cigarette tax, etc. Can you name other indirect taxes?

Delaware does not have a sales tax. Most states do have this tax. If you travel at all, you will have to pay the sales tax. To figure the tax, you take the rate (%) times the total purchase price and round off to the nearest cent.

A 1) The electric used in one month in a home costs $7.30. The utilities tax in the city is 15%. Find the total bill ? #8.40

2) Mrs. Smith went to the store and bought flour sugar and cocoa. Her groceries cost $2.40. The sales tax is 3%. What was her bill ? #2.47

3) Mr. Billings buys oilcloth which costs him $29.90. The sales tax is 3%. How much did he pay ? #30.80

4) Bill bought $240 worth of tools. If the sales tax is 4%, what is the total price of the tools ? #240.10

5) A car sells for $4356.00. The sales tax is 3%. How much tax was paid ? #130.68

6) A car sells for $5654. There is a sales tax of 3%. How much will the car cost ? #5823.62

B 7) Pennsylvania has a sales tax of 6%. If you buy a car in Pa. and it is delivered to a Pennsylvania address, you pay the tax. If it is delivered to a Delaware address you do not pay the tax. How much would a man living in Pennsylvania pay for a $3000 car. How much would a man living in Delaware pay for the same car? #3180 #3000

8) During a month a family has the following bills: water, $4.50; telephone, $2.75; gas, $4.25; electricity, $7.40. The uitility tax in the town is 25%. What is the total cost of utilities for the month #23.65

9) Some accessories are bought totaling $54.95. There is a state tax of 4% and a luxury tax of 10%. How much tax is placed on the purchase #62.65

A 1) Mr. Jones buys some sports equipment totaling $54. The sales tax is 3%. How much did he pay ? (#55.62)

2) The water bill for a home for a month is $5.40. What is the utility tax at the rate of 15% ? (#.81)

3) A bicycle costs $55. To this cost must be added a sales tax of 3%. How much must be paid in all ? (#56.65)

4) The cost of a season football ticket in a certain community is $8.25, plus 10% amusement tax. What will season tickets for a family of four cost including the tax ? (#36.32)

5) John buys fishing equipment totaling $59.60. There is a 4% sales tax. What is his total purchase ? (#61.98)

6) Mr. Brown buys a season ticket to basketball games. This cost is $9.85. There is a 10% amusement tax. How much will it cost him ? (#10.84)

B 7) Mrs. Smith buys a dress for $28.95, a pair of shoes for $11.98, and a pocketbook for $6.95. The sales tax is 4%. What was her bill ? (#49.80)

8) The utility tax in a town is 20%. In one month a family ran the following bills: telephone, $2.50; gas, $3.75; water, $4.30; electricity, $7.10. Find the total cost of the utilities including the tax for that month. (#21.18)

9) Roger bought a place setting of sterling silver for a wedding gift. There was a federal tax of 10% and a sales tax of 3% on the cost of the silver. If the place setting was priced at $22.50, what was the total paid including taxes ? (#25.43)

A 1) John bought a suit for $54. The sales tax is 4%. How much must John pay for his suit ? $56.16

2) Mary Scott buys a dress priced at $18.95, a pair of shoes priced at $12.95, and a hat priced at $7.50. The sales tax is 3%. Find the total amount of her bill. $40.58

3) Mrs. Jones bought a dress priced at $19.95 in a state having a 3% sales tax. Mrs. Smith bought the same dress in a state with no sales tax. How much more did Mrs. Jones pay than Mrs. Smith $.60

4) The years water bill in a home was $75. The utility tax is 15%. What was the total water bill for the year ? $11.25

5) The Jones family have a grocery bill of $54.95. The sales tax is 3%. What is the total amount paid at the grocery store ? $56.60

6) Mrs. Larkin bought some accessories totaling $25.99. The luxury tax is 10% and the sales tax is 3%. How much tax must she pay ? $1.04

B 7) Mrs. Barrett bought some jewelry totaling $59.63. The federal government has a luxury tax of 10% and the state tax is 3%. What was the total bill ? $62.02

8) In a town the utility tax is 15%. The Jones family has the following bills for one month: telephone, $2.10; gas, $3.50; water, $4.20; electricity, $6.73. Find the total cost of the tax and the utilities during the month. $19.01

9) Roger buys four place settings of sterling silver. It costs $22.50 a setting. There is a federal tax of 10% and a sales tax of 3% on the cost of the silver. How much must Roger pay ? $101.72

Direct Taxes

Direct taxes are paid directly to the federal, state, county, or city government. The most common direct taxex are the property and income taxes.

Property taxes are aid on both real and personal property. The real property is lands and buildings- generally it is what you refer to as real estate. The personal property is all other property. Generally it is all moveable property. Examples are jewelry, cars, etc.

In the direct tax we must know the ways to write a tax rate. This rate may be written in several different ways:

a) it might be a percent, as 2.34%

b) it might be based on $1000, $100, or $1 of taxable value (assessed value)

1) $23.40 per $1000, $2.34 per $100, or $.0234 per $1

Can you change these tax rates to each of the other forms?

A Change to indicated form:

1) 5% to $__?__ per $100 $5
2) 8% to $__?__ per $1 $.08
3) 4% to $__?__ per $100 $4
4) $3 per $100 to __?__ 3%
5) $1.50 per $100 = __?__ % 1.5%
6) $.06 per $1 = __?__ % 6%
7) 7 per $1 = __?__ 7%
8) $2.5 per $100 = __?__ % 2.5%

B Change to indicated form:

9) 3.6% to __?__ per $1 $.036
10) $.05 per $1 to __?__ % 5%
11) $3.64 per $100 to __?__ % 3.64%
12) $3.50 per $100 to __?__ % 3.5%
13) 8.25% to $__?__ per $100 $8.25
14) 3.24% to $__?__ per $1 $.0324
15) $34.50 per $1000 to __?__ % 3.45%
16) $.005 per $1 to __?__ % .5%

C Fill in the other three:

	%	$ per $1	$ per $100	$ per $1000
17)	3.24%	? $.0324	? $3.24	? $32.40
18)	? 7.25%	? $.0725	$7.25 per $100	? $72.50
19)	? 2.24%	? $.0224	? $2.24	$22.40 per $1000
20)	? 5%	$.005 per $1	? $.50	? $5
21)	4.85%	? $.0485	? $4.85	? $48.50
22)	? 1.325%	? $.01325	? $1.325	$13.25 per $1000

A Change as indicated:

1) 6% to \$? per \$100 \$6

2) 4% to \$? per \$1 \$.04

3) 3% to \$? per \$100 \$3

4) \$6 per \$100 to ? % 6%

5) \$.07 per \$1 = ? % 7%

6) \$1.20 per \$100 = ? % 1.2%

7) \$6 per \$100 = ? % 6%

8) 5% to \$? per \$100 \$5

B Change as indicated:

9) 10% to \$? per \$100 \$10

10) \$10 per \$100 = ? % 10%

11) \$5 per \$100 = ? % 5%

12) \$29 per \$100 = ? % 29%

13) \$540 per \$1000 = ? % 54%

14) \$60 per \$100 = ? % 60%

15) \$15 per \$100 = ? % 15%

C Fill in other three blanks:

	%	\$___per \$1	\$___per \$100	\$___per \$1000
16)	6.5%	? \$.065	? \$6.50	? \$65
17)	? 10%	\$.10	? \$10	? \$100
18)	? 12%	? \$.12	\$12	? \$120
19)	9.3%	? \$.093	? \$9.30	? \$93
20)	? 3%	\$.03	? \$3	? \$30
21)	15%	? \$.15	? \$15	? \$150
22)	? 50.4%	? \$.504	? \$50.40	\$504
23)	4.7%	? \$.047	? \$4.70	? \$47
24)	? 19%	? \$.19	\$19	? \$190
25)	? 6%	? \$.06	? \$6	\$60

A Change to indicated form:

1) 12% to $___?___ per $100 $12

2) 5% to $5 per $___?___ $100

3) 6% to $.06 per $___?___ $1

4) ___?___% to $17 per $100 17%

5) ___?___% to $1.90 per $10 19%

B Change as indicated:

6) $18 per $100 = ___?___% 18%

7) $29 per $1000 = ___?___% 2.9%

8) $640 per $___?___ = 64% $1000

9) $.07 per $1 = ___?___% 7%

10) $___?___ per $1 = 15% $.15

C Fill in other three blanks:

	%	$___per $1	$___per $100	$___per $1000
11)	.04%	___?___ $.0004	___?___ $.04	___?___ $.40
12)	___?___ 3%	.03	___?___ $3	___?___ $30
13)	___?___ 15%	___?___ $1.50	$15	___?___ $150
14)	___?___ 9.8%	___?___ $.198	___?___ $19.8	$198
15)	16%	___?___ $.16	___?___ $16	___?___ $160
16)	___?___ 28%	___?___ $.28	$28	___?___ $280
17)	___?___ 60%	$.60	___?___ $60	___?___ $600
18)	___?___ 1.986%	___?___ $.01986	___?___ $1.986	$19.86
19)	.42%	___?___ $.42	___?___ $42	___?___ $420
20)	___?___ 67%	___?___ $.67	$67	___?___ $670

We now know how to figure the tax rate. We shall continue and discuss one of Delaware's main direct taxes which is the property tax.

A building or land has a market value. This is the price which you might receive if you were to sell the property. Can you find some market values of houses in the different parts of the city ?

Buildings or lands also have an assessed value. This is the value put on the property by a government employee (tax assessor) for tax purposes. It is usually a certain percent of the market value. Can you find the assessed value of some houses in the city ?

To see how much you are going to pay in property tax, you must multiply the rate times the assessed value.

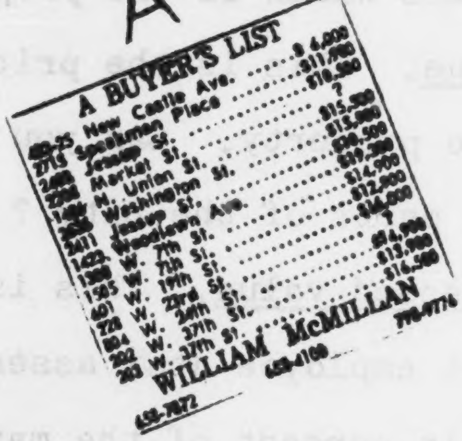
In Wilmington houses are assessed at 70% of their market value. You must pay a tax rate of $3.706 per $100 based on the assessed value.

Example: If a house has a market value of $9000 in Wilmington how much property tax will you pay ?

Assessed value = 70% of 9000
Assessed value = .70 x 9000
Assessed value = $6300

taxes = $3.706x (number of hundreds)
taxes = $3.706 x 63
taxes $233.478 or $233.48

A

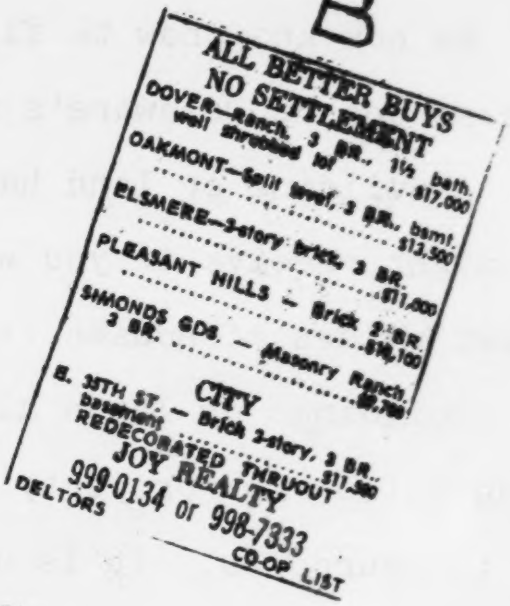


A BUYER'S LIST

403-25 New Castle Ave. .... $ 6,000
2715 Speakman Place $11,900
2400 Jessup St. $10,500
2200 Market St. .... ?
1400 N. Union St. $15,500
2200 Washington St. $15,900
2411 Jessup St. $15,500
1423 Woodlawn Ave. $10,500
1308 W. 7th St. $19,300
1505 W. 7th St. $14,900
601 W. 19th St. $12,900
728 W. 23rd St. $14,000
804 W. 24th St. .... ?
202 W. 37th St. $14,900
203 W. 37th St. $13,900
.... $16,500

WILLIAM McMILLAN
658-7872 658-4108 778-0776

B



ALL BETTER BUYS
NO SETTLEMENT

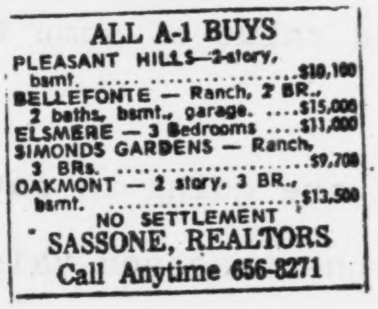
DOVER—Ranch, 3 BR., 1½ bath, well shrubbed lot $17,000
OAKMONT—Split level, 3 BR., bsmt. $13,500
ELSMERE—2-story brick, 3 BR. $11,000
PLEASANT HILLS — Brick 2 BR. $10,100
SIMONDS GDS. — Masonry Ranch, 3 BR. $9,700

CITY

E. 35TH ST. — Brick 2-story, 3 BR., basement $11,500
REDECORATED THRUOUT

JOY REALTY
999-0134 or 998-7333
DELTORS
CO-OP LIST

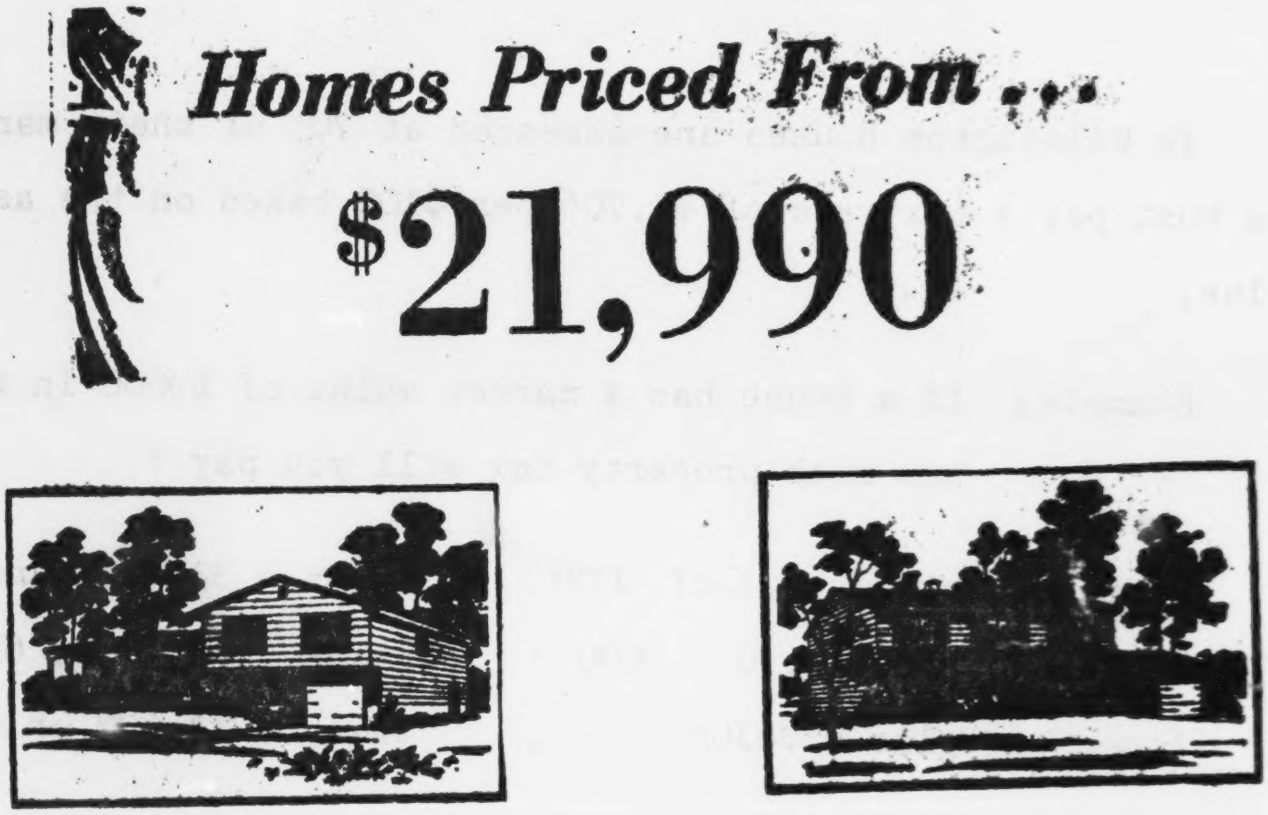
C



ALL A-1 BUYS

PLEASANT HILLS—2-story, bsmt. $10,100
BELLEFONTE — Ranch, 2 BR., 2 baths, bsmt., garage. $15,000
ELSMERE — 3 Bedrooms $11,000
SIMONDS GARDENS — Ranch, 3 BRs. $9,700
OAKMONT — 2 story, 3 BR., bsmt. $13,500

NO SETTLEMENT
SASSONE, REALTORS
Call Anytime 656-8271



A In the following problems assume that the assessed value is 70% of the market value (use preceding page)

1) What would be the assessed value of:
   a) the house in list A at 423-425 New Castle Ave. $4200
   b) the house in list A at 2411 Jessup St. $7350
   c) the house in list A at 202 W. 37th St. $9730

2) What would be the property tax on the house in list A at 423-425 New Castle Ave. if the tax rate for the city is $3.076 per $100 ?
$129.19

B Use 70% of the market value as the assessed value and a tax rate of $3.076 per $100

3) Find the property tax on the house at 203 W. 37th Street $355.28

4) Find the property tax on the house in list B in Elsmere $236.85

5) The house in Oakmont in list C would require what yearly tax ?
$290.68

C If houses in the city paid the city property tax as used in section B above plus a New Castle county tax of $.67 per $100

6) What would be the total property taxes paid on the house at 3626 Washington St.
$342.36 city
74.57 county
$416.93 total

7) What is total property tax on the house on Woodlawn Ave.
$415.57 city
90.52 county
$506.09 total

A In the following problems, assume that the assessed value is 70% of the market value

1) What would be the assessed value of:

a) The house in list A at 1406 N. Union St. #10850

b) The house in list A at 804 W. 24th St. #10430

c) The house in list A at 1423 Woodlawn Ave. #13510

2) What would be the property tax on the house in list A at 1406 N. Union St. if the tax rate for the city is $3.076 per $1

#333.75

B Use 70% of the market value as the assessed value and a tax rate of $3.076 per $100

3) Find the property tax on the house at 1423 Woodlawn Ave. #415.57

4) Find the property tax on the house in list B in Oakmont. 390.68

5) The house in Bellefonte in list C would require what yearly tax ?

#322.98

C If houses in the city paid the city property tax as used in section B above, plus a New Castle county tax of $.67 per $100

6) What would be the total property taxes paid on the house at 2715 Speakman Place?

#256.23 city
55.81 county
#312.04 total

7) What is the total property tax on the house on W. 19th St?

#344.51 city
75.04 county
#419.55 total

A In the following problems, assume that the assessed value is 70% of the market value.

1) What would be the assessed value of :

a) The house in list B on E. 35th St. #8050

b) The house in list A 203 W. 37th St. #11550

c) The house in list B in Pleasant Hills. #7070

2) What would be the property tax on the house in list B on E. 35th St. if the tax rate for the city is $3.076 per $100 #247.62

B Use 70% of the market value as the assessed value and a tax rate of $3.076 per $100.

3) Find the property tax on the house at 203 W. 37th St. #355.28

4) Find the property tax on the house in list B in Simonds Gds. #208.86

5) The house in Pleasant Hills in list C would require what yearly tax. #217.47

C If houses in the city paid the city property tax as used in section B above, plus a New Castle county tax of $.67 for $100.

6) What would be the total property taxes paid on the house at Simonds Gds.

#208.86 city
45.49 county
#254.35 total

7) What is the total property tax on the house at 1505 W. 7th St.

#277.76 city
60.50 county
#338.26 total

In other sections of the country the tax rate might be expressed in one of the other forms which we have studied. Let's take an example and work through each rate. To figure the taxes you will always multiply the rate times the assessed value

Taxes (to be paid) = Tax rate x Assessed value

Example: How much in taxes will you pay for a house assessed at $8000

a) with tax rate 4%

Taxes = rate x assessed value

= .04 x 8000

= $320

b) with tax rate $.04 per $1

Taxes = $.04 x (number of $1's)

= $.04 x $8000

= $320

c) with tax rate $4 per $100

Taxes = $4 x (number of $100's)

= $4 x 80

= $320

d) with tax rate $40 per $1000

Taxes = $40 x (number of $1000's)

= $40 x 8

= $320

A 1) Mr. Williams owns some property assessed at $7500. The tax rate is $.025 per $1. What is the tax ? ($187.50)

2) John Jones owns a piece of property assessed at $8500. His tax rate is $3.75 per $100. What is his tax ? ($318.75)

3) Mr. Curry has a house and lot assessed at $6200. His tax rate is $4.50 per $100. ($279)

a) Without paper and pencil estimate his tax

b) Find the tax with paper and pencil

c) What is the difference ?

B 4) Mr. Gray lives in a community where they assess property at 75% of its market value. Mr. Gray's home has a market value of $12000. If the tax rate is 2.5% of the assessed value, what should his tax be ? ($225)

5) Mr. Strong has to pay real estate tax. His property is assessed at $7800. The tax rate is $2.845 per $100. What tax must he pay? ($221.91)

6) Mildred's father said their home was assessed at $13500. She learned that the community's tax rate was $2.36 per $100. What will the father pay in taxes ? ($318.60)

C 7) Mr. Thomson owns property with a market value of $11500. If the tax rate is $.0324 per $1 assessed on 80% of the market value. What is his tax ? ($298.08)

8) Can you figure this ? All the property in a community has an assessed value of $4860000. The money needed (taxes) for the budget is $132500. What tax rate will this community have to charge?

(.027 or 2.7%)

A 1) Mr. Reese owns some property assessed at $9500. The tax rate is $4.75 per $100. What is his tax ? #451.25

2) A piece of property is assessed at $8500. The tax rate is $3.54 per $100. What is the tax ? #300.90

3) The DiMaio's property is assessed at $5258. The tax rate is $.036 per $1. What is their tax ? #189.29

B 4) In the neighborhood where Mr. Jones lives, property is assessed at 73% of its market value. If Mr. Jone's home has a market value of $15300 and the tax rate is 3.2% of the assessed value, what will his tax be ? #357.41

5) If a property is assessed at $8900, and the tax rate is $98.72 per $1000. What is the tax ? #878.61

6) If a home is assessed at $12900 and the community's tax rate is $4.31 per $100 how much tax must be paid ? #555.99

C 7) If property is owned with a market value of $11579 and the tax rate is $.0573 per $1 and is assessed at 60% of the market value, find the tax. #398.09

8) Jim has property with a market value of $12700. If the tax rate is $.0543 per $1 assessed at 83% of the market value find the tax ? #572.38

A 1) Mr. Johnson owns some property assessed at $8760. The tax rate is $.032 per $1. What is the tax ? ($280.32)

2) Mr. Joslin owns a piece of property assessed at $8754. His tax rate is $4.92 per $100. What is his tax ? ($430.70)

3) If the tax rate is $4.63 per $100, and a piece of land is assessed at $6743 what is the tax ? ($312.20)

B 4) Property in an area is assessed at 63% of its market value. The home has a market value of $15000. If the tax rate is 3.6% of the assessed value, what is the tax ? ($340.20)

5) Some property is assessed at $8700. The tax rate is $32.53 per $1000. What tax must be paid on the land ? ($283.01)

6) A house is assessed at $14600. The community tax rate is $2.36 per $100. How much tax must be paid ? ($344.56)

C 7) Some property has a market value of $12700. If the tax rate is ($431.60) $.0472 per $1 assessed at 72% of the market value, what is the **tax** ?

8) All the property in a community has an assessed value of $5790000. The money needed (taxes) for the budget is $201900. What tax rate will this community have to charge ? (.035 or 3.5%)

Federal

Income Tax

Income tax, as its name states, is based on your annual earnings. It is paid once a year. Those persons earning over $600 must file a return. It is wise to complete the form if you did not earn $600 a year, but had money deducted for taxes during the year. This is the only way to have that money refunded (returned) to you.

The tax department has a simplified form which is shown on the following pages. This is for people earning under $10,000 a year and whose deductions are not greater than 10% of their earnings.

Income - all money coming in to you from wages, interest, dividends, bonuses, etc.

Deductions - all money going out for certain approved things as contributions, interest paid out, etc. You may use 10% of your total salary, or list all deductions.

Dependents - are persons to whom you give at least half of their support-generally yourself, your wife, children, etc. The amount allowed for dependents is $600 x the number of dependents.

Taxable income - gross (total) income less your deductions and dependents allowance.

Taxes due - this amount can be found by using tax "table A" or by using the "Tax Computation Table" at bottom of Form #1040 A

The forms which follow are to be gone over in class carefully before doing the following problems.

A Taxable income = Total income - (deductions and dependents, at $600 each)

1) Compute the taxable income of Mr. Tyler if
   - a) His gross income was $5000
   - b) He has 3 dependents (including self) (#2700)
   - c) He takes the 10% standard deduction.

2) Compute Mr. Martins taxable income if
   - a) His gross income cosisted of $6250 in salary, $500 in commissions, and $200 in bonuses (#2350)
   - b) He is married and has 3 dependent children plus wife
   - c) He itemizes deductions of $500 for charity, $700 for interest, and $400 for non-Federal taxes.

3) Find taxable income for each person

a) John Locke	$7215.00	Wife- (no income)	10% standard (#5293.50)
b) Frank Jones	$10751.78	Wife- (no income) & 4 children	Itemized total of $1683.15 (#5468.65)
c) Mr.&Mrs. Grey	$7152 and $843	3 children	10% standard (#5977.50)

B 4) Mr. White had a gross income of $5612.15. His wife had a gross income of $3421.02. They had 2 dependent children and will take the 10% standard deduction. Compute taxable income.

$5729.85

C 5) Mr. Arkette's income consisted of the following: wages, $6115.17; profit from auto sale $200; bonus $175. Mrs. Arkette's income consisted of the following: wages, $2139; tips, $951.15. They have 3 dependent children. Mr. Arkette's father and Mrs. Arkette's mother and father are also dependents. They will itemize the following deductions: contributions $75.25; interest (paid out) $617.52; taxes $515.08; medical expenses deductible $319. Find taxable income on joint return.

$2153.47

A 1) Compute the taxable income of Mr. Forman if:

a) His gross income is $4500

b) He has 4 dependents (including himself) $1650

c) He takes the 10% standard deduction.

2) Compute Mr. Bennett's taxable income if:

a) His gross income consists of $6,420 in salary, $490 in commissions, and $150 in bonuses.

b) He has 2 dependent children and his wife $3360

c) He itemizes deductions of $300 for charity, $600 for interest, and $400 for non-Federal taxes.

3) Find the taxable income for each of the following people:

Taxpayer	Gross Income	Dependents	Deductions
a) Jim Smith	$7325.00	3 children & wife (no income)	Itemised total of $1473.64 $2861.36
b) Charles Brown	$12749.00	wife (no income) & 2 children	10% standard $9074.10
c) Mr. & Mrs. Place	$7229.00 and $699.00	2 children	10% standard $4736.20

B 4) Mr. Thomas had a gross income of $5429.29. His wife had a gross income of $3242.21. They had 2 dependent children and will take the 10% standard deduction. Compute the taxable income.

#5404.26

C 5) Mr. Kent's income consisted of the following: wages, $6023; bonus, $215. Mrs. Kent's income consisted of the following: wages, $2051; tips $872. They have 5 dependent children. Mr. Kent's mother lives with them and is a dependent. They will itemkze the following deductions: contributions, $73.22; interest (paid out) $612.78; taxes $511; medical expenses deductible $315. Find the taxable income on joint returns.

#2849

A 1) Compute the taxable income of Mr. Jones if:

a) His gross income is $5500

b) He has 3 dependents (including himself) ($3330)

c) He takes the 10% standard deduction

2) Compute Mr. Smith's taxable income if:

a) His gross income is $7,525

b) He has 3 dependent children and his wife ($4072.50)

c) He takes the 10% standard deduction

3) Find the taxable income for each of the following people:

	Taxpayer	Gross Income	Dependents	Deductions
a)	Joe Nichols	$7252	wife (no income) 3 children	10% standard
				($3826.80)
b)	Mr. & Mrs. Chrzanowski	$11,527 and $6,724	3 children	itemized total of $1476
				($13775)
c)	Jim Hansen	$6,724	2 children & wife (no income)	10% standard
				($3891.60)

B 4) Mr. Dominick had a gross income of $4234. His wife had a gross income of $2322. They had 2 dependent children and will take the 10% standard deduction. Compute the taxable income.

($3740.40)

To figure the tax due and the surtax (also called tax surcharge), which is due as a single person, you use Federal Tax Table A and the Tax Surcharge Tables.

To read Tax Table A you locate the yearly pay in the left column. You then read to the right to the column with the correct number of dependents. The amount that appears in this place is the tax due from your income.

Example: You earn $3005, are single and have a total of two dependents. You look for $3005 in the total income columns (it is between $300 and $3050). You then go right to the column marked 2 at the top and read the number 213. This means $213 is the tax on you income.

The surtax is an additional tax which is figured at 10% or less based on your basic tax due figure. Tax surcharge tables will be with your tax form each year.

To figure the surtax you should look at the Tax Surcharge Table, Table 1. Look at the amount of tax due and to the right you will find the surtax which is due.

Example: You look in the Surtax table to Table 1 for single persons. You look for $213 (which is between 208 and 215). To the right of that line you will find the number 10, meaning the surtax is $10.

These figures are put on line 8 of the form 1040 A in a. and b. places and added.

Example: 8 a. Tax $213 + b. Surcharge $10 c. Total $223

Tax Table A

Tax Tables for Incomes Under $5,000

If your total income (item 7 of your return) is $5,000 or more, use Tax Computation Schedule on page 4

If you checked as your filing status on page 1, Form 1040A		
	Item 4a. Single, use	Tax Table A
	Item 4b. Married Filing Joint Return, use	Tax Table B
	Item 4c. Married Filing Separately, use	Tax Table C

▶ Tables A and B reflect the lowest tax after considering both the 10 percent standard deduction and the minimum standard deduction. Table C shows the tax based on either the 10 percent or the minimum standard deduction.

1968 TAX TABLE A—For Single Persons

To find your tax read down income columns until you find the line covering the total income shown as item 7. Then read across to the appropriate column headed by the number corresponding to the number of exemptions claimed on item 15. Enter tax in item 8a. Also see page 8 for surcharge to be entered in item 8b.

If your total income is—		And the number of exemptions is—		
At least	But less than	1	2	3 If 4 or more there is no tax
		Your tax (before surcharge) is—		
$0	$900	$0	$0	$0
900	925	2	0	0
925	950	5	0	0
950	975	9	0	0
975	1,000	12	0	0
1,000	1,025	16	0	0
1,025	1,050	19	0	0
1,050	1,075	23	0	0
1,075	1,100	26	0	0
1,100	1,125	30	0	0
1,125	1,150	33	0	0
1,150	1,175	37	0	0
1,175	1,200	40	0	0
1,200	1,225	44	0	0
1,225	1,250	47	0	0
1,250	1,275	51	0	0
1,275	1,300	54	0	0
1,300	1,325	58	0	0
1,325	1,350	61	0	0
1,350	1,375	65	0	0
1,375	1,400	68	0	0
1,400	1,425	72	0	0
1,425	1,450	76	0	0
1,450	1,475	79	0	0
1,475	1,500	83	0	0
1,500	1,525	87	0	0
1,525	1,550	91	0	0
1,550	1,575	94	0	0
1,575	1,600	98	0	0
1,600	1,625	102	2	0
1,625	1,650	106	5	0
1,650	1,675	109	9	0
1,675	1,700	113	12	0
1,700	1,725	117	16	0
1,725	1,750	121	19	0
1,750	1,775	124	23	0
1,775	1,800	128	26	0
1,800	1,825	132	30	0
1,825	1,850	136	33	0
1,850	1,875	139	37	0
1,875	1,900	143	40	0
1,900	1,925	147	44	0
1,925	1,950	151	47	0
1,950	1,975	155	51	0
1,975	2,000	159	54	0
2,000	2,025	163	58	0
2,025	2,050	167	61	0
2,050	2,075	171	65	0
2,075	2,100	175	68	0
2,100	2,125	179	72	0
2,125	2,150	183	76	0
2,150	2,175	187	79	0
2,175	2,200	191	83	0
2,200	2,225	195	87	0
2,225	2,250	199	91	0
2,250	2,275	203	94	0
2,275	2,300	207	98	0
2,300	2,325	211	102	2
2,325	2,350	215	106	5
2,350	2,375	219	109	9
2,375	2,400	223	113	12
2,400	2,425	227	117	16
2,425	2,450	231	121	19

If your total income is—		And the number of exemptions is—					
At least	But less than	1	2	3	4	5	6 If 7 or more there is no tax
		Your tax (before surcharge) is—					
$2,450	$2,475	$236	$124	$23	$0	$0	$0
2,475	2,500	240	128	26	0	0	0
2,500	2,525	244	132	30	0	0	0
2,525	2,550	248	136	33	0	0	0
2,550	2,575	253	139	37	0	0	0
2,575	2,600	257	143	40	0	0	0
2,600	2,625	261	147	44	0	0	0
2,625	2,650	265	151	47	0	0	0
2,650	2,675	270	155	51	0	0	0
2,675	2,700	274	159	54	0	0	0
2,700	2,725	278	163	58	0	0	0
2,725	2,750	282	167	61	0	0	0
2,750	2,775	287	171	65	0	0	0
2,775	2,800	291	175	68	0	0	0
2,800	2,825	295	179	72	0	0	0
2,825	2,850	299	183	76	0	0	0
2,850	2,875	304	187	79	0	0	0
2,875	2,900	308	191	83	0	0	0
2,900	2,925	312	195	87	0	0	0
2,925	2,950	317	199	91	0	0	0
2,950	2,975	322	203	94	0	0	0
2,975	3,000	327	207	98	0	0	0
3,000	3,050	333	213	104	4	0	0
3,050	3,100	342	221	111	11	0	0
3,100	3,150	350	229	119	18	0	0
3,150	3,200	359	238	126	25	0	0
3,200	3,250	367	246	134	32	0	0
3,250	3,300	376	255	141	39	0	0
3,300	3,350	385	263	149	46	0	0
3,350	3,400	393	272	157	53	0	0
3,400	3,450	402	280	165	60	0	0
3,450	3,500	410	289	173	67	0	0
3,500	3,550	419	297	181	74	0	0
3,550	3,600	427	306	189	81	0	0
3,600	3,650	436	315	197	89	0	0
3,650	3,700	444	324	205	96	0	0
3,700	3,750	453	334	213	104	4	0
3,750	3,800	462	343	221	111	11	0
3,800	3,850	470	353	229	119	18	0
3,850	3,900	479	362	238	126	25	0
3,900	3,950	487	372	246	134	32	0
3,950	4,000	496	381	255	141	39	0
4,000	4,050	504	390	263	149	46	0
4,050	4,100	513	399	272	157	53	0
4,100	4,150	521	407	280	165	60	0
4,150	4,200	530	416	289	173	67	0
4,200	4,250	538	424	297	181	74	0
4,250	4,300	547	433	306	189	81	0
4,300	4,350	556	442	315	197	89	0
4,350	4,400	564	450	324	205	96	0
4,400	4,450	573	459	334	213	104	4
4,450	4,500	581	467	343	221	111	11
4,500	4,550	590	476	353	229	119	18
4,550	4,600	598	484	362	238	126	25
4,600	4,650	607	493	372	246	134	32
4,650	4,700	615	501	381	255	141	39
4,700	4,750	624	510	391	263	149	46
4,750	4,800	633	519	400	272	157	53
4,800	4,850	641	527	410	280	165	60
4,850	4,900	650	536	419	289	173	67
4,900	4,950	658	544	429	297	181	74
4,950	5,000	667	553	438	306	189	81

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SURTAX TABLE

1968 Tax Surcharge Tables

TABLE 1.— Single person (other than head of household) and married person filing separate return

If line 8a is:			If line 8a is:			If line 8a is:			If line 8a is:			If line 8a is:		
At least	But less than	Enter on line 8b	At least	But less than	Enter on line 8b	At least	But less than	Enter on line 8b	At least	But less than	Enter on line 8b	At least	But less than	Enter on line 8b
$0	$148	$0	$222	$228	$12	$313	$327	$24	$473	$487	$36	$633	$647	$48
148	155	1	228	235	13	327	340	25	487	500	37	647	660	49
155	162	2	235	242	14	340	353	26	500	513	38	660	673	50
162	168	3	242	248	15	353	367	27	513	527	39	673	687	51
168	175	4	248	255	16	367	380	28	527	540	40	687	700	52
175	182	5	255	262	17	380	393	29	540	553	41	700	713	53
182	188	6	262	268	18	393	407	30	553	567	42	713	727	54
188	195	7	268	275	19	407	420	31	567	580	43	727	734	55
195	202	8	275	282	20	420	433	32	580	593	44	734 and over, multiply amount on line 8a by .075 and enter result on line 8b.		
202	208	9	282	288	21	433	447	33	593	607	45			
208	215	10	288	298	22	447	460	34	607	620	46			
215	222	11	298	313	23	460	473	35	620	633	47			

TABLE 2.— Married persons filing joint return

If line 8a is:			If line 8a is:			If line 8a is:			If line 8a is:			If line 8a is:		
At least	But less than	Enter on line 8b	At least	But less than	Enter on line 8b	At least	But less than	Enter on line 8b	At least	But less than	Enter on line 8b	At least	But less than	Enter on line 8b
$0	$293	$0	$367	$373	$12	$447	$453	$24	$527	$533	$36	$633	$647	$48
293	300	1	373	380	13	453	460	25	533	540	37	647	660	49
300	307	2	380	387	14	460	467	26	540	547	38	660	673	50
307	313	3	387	393	15	467	473	27	547	553	39	673	687	51
313	320	4	393	400	16	473	480	28	553	560	40	687	700	52
320	327	5	400	407	17	480	487	29	560	567	41	700	713	53
327	333	6	407	413	18	487	493	30	567	573	42	713	727	54
333	340	7	413	420	19	493	500	31	573	580	43	727	734	55
340	347	8	420	427	20	500	507	32	580	593	44	734 and over, multiply amount on line 8a by .075 and enter result on line 8b.		
347	353	9	427	433	21	507	513	33	593	607	45			
353	360	10	433	440	22	513	520	34	607	620	46			
360	367	11	440	447	23	520	527	35	620	633	47			

Find the answers from Federal tax table A and the surtax table.

A 1) Tax for a single person making $625. (#0)

2) Surtax for a single person making $625. (#0)

3) Tax for a single person making $1720. (#117)

4) Surtax for a single person making $1720 (#0)

5) Tax for a single person with a total of 2 dependents earning $3949. (#2749)

6) Surtax for person in problem 5. (#372)

B 7) Tax for a single person with a total of 2 dependents making $3102. (#209)

8) Surtax for person in problem 7. (#13)

9) Tax for a single person with a total of 3 dependents earning $4329. (#315)

10) Surtax for person in problem 9. (#4)

C 11) Tax and surtax for a single man earning $3247 a year. (#367, #12)

12) Tax and surtax for a single man earning $4731 a year. (#624, #47)

13) Tax and surtax for a single man earning $4287 a year. (#547, #39)

14) Tax and surtax for a single man with a total of 3 dependents earning $3698 a year. (#205, #9)

Find the answers from Federal tax table A and the surtax table.

A 1) Tax for single person making $660. #0

2) Surtax for single person making $660. #20

3) Tax for single person making $1025. #19

4) Surtax for single person making $1025. #0

5) Tax for a single person with total of 2 dependents earning $3250. #2.35

6) Surtax for person in problem 5. #1.2

B 7) Tax for a single person with total of 4 dependents making $2888. #0

8) Surtax for person in problem 7. #0

9) Tax for a single man with total of 3 dependents earning $4750. #400

10) Surtax for person in problem 9. #17

C 11) Tax and Surtax for single man earning $3296 a year. #376 #13

12) Tax and Surtax for a single man with a total of 2 depencents earning $4119 a year. #407 #15

13) Tax and Surtax for a single man earning $2120 per year. #179 #5

14) Tax and surtax for a single man with a total of 3 depenients earning $4999 a year. #438 #52

Find the answers from Federal tax table A and the surtax table.

A 1) Tax for a single person making \$750. \$0

2) Surtax for a single person making \$750. \$0

3) Tax for a single person making \$1,278. \$54

4) Surtax for a single person making \$1,278 \$0

5) Tax for a single person with a total of 2 dependents earning \$3924. \$372

6) Surtax for person in problem 5. \$12

B 7) Tax for a single person with a total of 2 dependents making \$2819. \$1.79

8) Surtax for person in problem 7. \$5

9) Tax for a single person with a total of 3 dependents earning \$4012. \$243

10) Surtax for person in problem 9. \$18

C 11) Tax and surtax for a single man earning \$3229 a year. \$367, \$12

12) Tax and surtax for a single man with a total of 4 dependents earning \$4327 a year. \$197, \$8

13) Tax and surtax for a single man earning \$2,324 per year. \$211, \$10

14) Tax and surtax for a single man earning \$3457 a year. \$410, \$18

To fill out a tax form 1040 A completely:

1) Read the form carefully.

2) Start at step 1 and go in order until you complete the form.

3) Draw a dash (——) where you have no information to put in form.

4) Check your arithmetic after each step.

5) Use "Tax Computation Schedule" instead of Tax Table A if total income is over $5000.

6) Figure your surcharge carefully by reading from the table.

7) Sign form correctly.

8) RECHECK ALL INFORMATION, ESPECIALLY THE ARITHMETIC.

9) It is wise to make a duplicate copy for your own future information.

Ditto available

Form **1040A U.S. Individual Income Tax Return**

If item 7 is $10,000 or more, or if total income from interest, dividends, and nonwithheld wages is over $200, use Form 1040.

1968

U.S. Treasury Department
Internal Revenue Service

Please print

① Name (If joint return, use first names and middle initials of both)

Home address (Number and street or rural route)

City, town or post office, State and ZIP code

② Your social security number

③ Spouse's social security number

4. Check one:
☐ a. Single;
☐ b. Married filing joint return (even if only one had income);
☐ c. Married filing separately—If spouse is also filing a return, enter her (his) social security number in item 3 and give first name here ▶

Enter below name and address used on your return for 1967. (If same as above, write "Same.") If none filed, give reason. If changing from separate to joint or joint to separate returns, enter 1967 names and addresses.

If item 7 is $5,000 or more, compute tax & surcharge & pay item 10 in full with return. If under $5,000, IRS will compute tax if you omit items 8, 10 & 11 (but complete item 9).

For tax, see instructions: pages 5–7 for regular tables, page 8 for surcharge, page 4 for $5,000 or more computation. ▶

Apply refund to: ☐ U.S. Savings Bonds, & excess refunded; or ☐ Refund only.

LIST YOUR EXEMPTIONS AND SIGN ON OTHER SIDE.

⑤ Enter total wages, salaries, tips, etc. Enclose Forms W-2, Copy B. If not shown on enclosed Forms W-2 attach explanation. Yours ▶ Spouse's ▶

(6a) Interest Yours ▶ Spouse's ▶

(6b) Dividends: Yours—before exclusion $ After ▶
(See instr.) Spouse's—before exclusion $ After ▶

⑦ Total income (add items 5, 6a, and 6b) ▶

⑧ a. Tax $ + b. Surcharge $ c. Total ▶

⑨ Total Federal income tax withheld (from Forms W-2) ▶

⑩ If item 8c is larger than item 9, enter **Balance due** ▶

⑪ If item 9 is larger than item 8c, enter **Refund** ▶

⑫ **EXEMPTIONS FOR YOURSELF—AND SPOUSE (only if all her (his) income is included in this return, or she (he) had no income)** Check boxes which apply →

	Regular	65 or over	Blind
Yourself	☐	☐	☐
Spouse	☐	☐	☐

Enter number of boxes checked ▶

⑬ First names of your dependent children who lived with you Enter number ▶

⑭ DEPENDENTS OTHER THAN THOSE CLAIMED IN ITEM 13.	(a) NAME ▶ Enter figure 1 in the last column to right for each name listed (if more space is needed, attach schedule)	(b) Relationship	(c) Months lived in your home. If born or died during year also write "B" or "D"	(d) Did dependent have income of $600 or more?	(e) Amount YOU furnished for dependent's support. If 100% write "ALL"	(f) Amount furnished by OTHERS including dependent. See instruction 14	
					$	$	▶
							▶
							▶

15. TOTAL EXEMPTIONS FROM ITEMS 12, 13, AND 14 ABOVE ▶

Your present employer and address

If you had an expense allowance or charged expenses to your employer, see instructions for "Reimbursed Expenses" and check here ☐ if appropriate.

Under penalties of perjury, I declare that to the best of my knowledge and belief this is a true, correct, and complete return.

Sign here ▶ Your signature Date

▶ Spouse's signature (If filing jointly, BOTH must sign even if only one had income) Date

Tax Computation Schedule *(Use only if total income, item 7 of Form 1040A, is $5,000 or more)*

1 Enter total income from item 7 of Form 1040A . . . . $

2 Enter the standard deduction which is explained on page 2 of the instructions (married person filing a separate return cannot claim more than $500) . . . .

3 Subtract line 2 from line 1 . . . .

4 Multiply $600 by total number of exemptions claimed in item 15 of Form 1040A . . .

5 Subtract line 4 from line 3 . . . .

6 Tax on amount on line 5. Use appropriate tax rate schedule below. Enter here and in item 8a of Form 1040A . . . . $

Also see page 8 for surcharge to be entered in item 8b. (Do not attach this schedule to Form 1040A)

▶ **If you are a single taxpayer or a married taxpayer filing a separate return, use this tax rate schedule**

If the amount on line 5 of Tax Computation Schedule is:

Over	But not over	Enter on line 6:
$0	$500	14% of the amount on line 5
$500	$1,000	$70, plus 15% of excess over $500
$1,000	$1,500	$145, plus 16% of excess over $1,000
$1,500	$2,000	$225, plus 17% of excess over $1,500
$2,000	$4,000	$310, plus 19% of excess over $2,000
$4,000	$6,000	$690, plus 22% of excess over $4,000
$6,000	$8,000	$1,130, plus 25% of excess over $6,000
$8,000	$9,999.99	$1,630, plus 28% of excess over $8,000

▶ **If you are married taxpayers filing a joint return, use this tax rate schedule**

If the amount on line 5 of Tax Computation Schedule is:

Over	But not over	Enter on line 6:
$0	$1,000	14% of the amount on line 5
$1,000	$2,000	$140, plus 15% of excess over $1,000
$2,000	$3,000	$290, plus 16% of excess over $2,000
$3,000	$4,000	$450, plus 17% of excess over $3,000
$4,000	$8,000	$620, plus 19% of excess over $4,000
$8,000	$9,999.99	$1,380, plus 22% of excess over $8,000

A Figure tax due on paper (not on the forms). Use tax Table A, find tax due.

1) You are single. Your salary is $1500. You use standard 10% deduction. #87

2) You are single. Your salary is $3300. Your deductions are standard. #385

3) You are single, have a total of 2 dependents. Your income is $4500. Use standard deductions. #476

4) You are single and earn $4000. You have standard deductions. #504

5) You are single and earn $3000. Your deductions are standard for the year. #333

6) Using your name and "making-up" the rest of the information not given, fill in completely form #1040A. Assume you are single and earning $1840 a year. You are going to take the standard 10% deduction. #136

B Fill out complete form 1040A using your name (you may make-up dependents names, social security number, etc.) Assume you are single, have 2 dependents (a mother and an aunt) and deductions are standard 10%. Your salary is $5310 for the year. Use "Tax Computation Schedule". #496.01

A Figure tax due on paper (Not on the forms) Use tax table A find tax due.

1) You are single. Your salary is $1900. You use standard 10% deduction. #147

2) You are single. Your salary is $3293. Your deductions are standard. #376

3) You are married, have a wife and 1 child. Your income is $5200 with standard deductions. Use "Tax Computation Schedule" #430.80

4) Using your name and "making-up" the rest of the information not given, fill in completely form #1040A. Assume you are single and earning $1765 a year. You are going to take the standard 10% deduction. #124

B Use "Tax Computation Schedule" if your deductions are over 10% of your income.

5) You are single and earn $3421. Your deductions are standard for the year. #402

C Fill out complete form using your name (You may make up dependents name, social security number, etc.) Assume you are single, have 1 dependent (your mother), and standard deductions. Your salary is $5212 for the year. Use "Tax Computation Schedule." #593.25

A Figure tax due on paper (not on the forms). Use tax table A, find tax due.

1) You are single. Your salary is $1432. You use standard 10% deduction. (#76)
2) You are single. Your salary is $3765. Your deductions are standard. (#462)
3) You are married, have a wife and no children, but your mother is a dependent. Your income is $5672. You figure your deductions are standard. Use "Tax Computation Schedule". (#671.91)
4) Using your name and "making-up" the rest of the information not given, fill in completely form #1040A. Assume you are single and earning $1648 a year. You are going to take the standard 10% deductions. (#106)
5) You are single and earn $3672. Your deductions are standard. (#444)

B Fill out completely, form using your name. (You may make up dependents name, social security number, etc.) Assume you are single, have a total of 2 dependents, and deductions are standard. Your salary is $[illegible]283 for the year. (#790.03)

City of Wilmington Wage Tax

The City of Wilmington has a wage tax. This tax is $\frac{1}{2}\%$ of your gross (total) salary. Everyone will pay this tax. Employers will take it out of the workers wages. At the end of the year, if you have made less than $4000 for the year you will not have to pay the City Wage Tax. You will get a refund at the time you file your state income tax.

Example:

You earn $7874 this year. How much wage tax will pay.

$$\text{wage tax} = \frac{1}{2}\% \text{ of } \$7874$$

$$= .005 \times \$7874$$

$$= \$39.37$$

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A Figure the Wilmington wage tax which will be taken from the pay.

1) You earn $5021 this year. $25.11

2) You earn $3271 this year. $16.36

3) You earn $2198 this year. $10.99

4) You earn $4632 this year. $23.16

B Find total Wilmington wage tax.

5) You earn $2972 the first 6 months of the year, and $2742 the second 6 months. $28.57

6) You earn $2572 a year from one employer. On a second job you earn $2329. $24.41

7) How much tax would you pay each of these 3 months when you earn $298, $327, $248. $1.49, $1.64, $1.24

C 8) During the year your earnings for the 12 months are $128, $163, $99, $272, $327, $297, $263, $198, $120, $98, $299, $187

How much eage tax did you have taken from your pay each month ?
$.64, $.82, $.50, $1.36, $1.64, $1.49, $1.32, $.99, $.85, $.49, $1.50, $.94

How much wage tax did you pay for the year ? $12.51

A Figure the Wilmington wage tax which will be taken from the pay.

1) You earn $5016 this year. #25.08

2) You earn $3286 this year. #16.43

3) You earn $2078 this year. #10.39

4) You earn $4631 this year. #23.16

B Find the total Wilmington wage tax:

5) You earn $2786 the first 6 months of the year and $2964 the second 6 months. #28.75

6) You earn $3678 a year from one employer. On a second job you earn $2989. #33.34

7) How much tax would you pay each of these 4 months when you earn $262, $344, $372, $298 #1.31, #1.72, #1.86, #1.49

C 8) During the year your earnings for the 12 months are $207, $300, $198, $272, $187, $98, $186, $144, $206, $213, $219, $184.

How much wage tax was taken from your pay each month ?

#1.04, #1.50, #.99, #1.36, #.94, #.49, #.93, #.72, #1.03, #1.07, #1.10, #.92

How much wage tax did you pay for the year ?

#12.07

A Figure the Wilmington Wage Tax which will be taken from the pay:

1) You earn $6012 this year. $30.06

2) You earn $3294 this year. $16.47.

3) You earn $3962 this year. $19.81

4) You earn $2792 this year. $13.96

B Find total Wilmington Wage Tax:

5) You earn $3000 the first 6 months of the year and $2596 the second 6 months. $27.98

6) You earn $2500 a year from one employer. On a second job you earn $2515. $25.08

7) How much tax would you pay each of thee 3 months when your earnings are $274, $307, $257. $13.70, $15.35, $12.85

C During the year your earnings for the 12 months are:

$137, $300, $98, $210, $170, $170, $170, $200, $170, $200, $176,

$205, $114.

How much wage tax did you have taken from your pay each month ?

$.69, $1.50, $.49, $1.05, $.85, $.85, $1.00, $.85, $1.00, .88, $1.03, $.57

How much wage tax did you pay for the year ?

$10.75

State Tax Problems

The State Tax short form #200A - 6B is shown on the following page. It is filled-in like the Federal Form 1040A. It explains itself if you go slowly step by step.

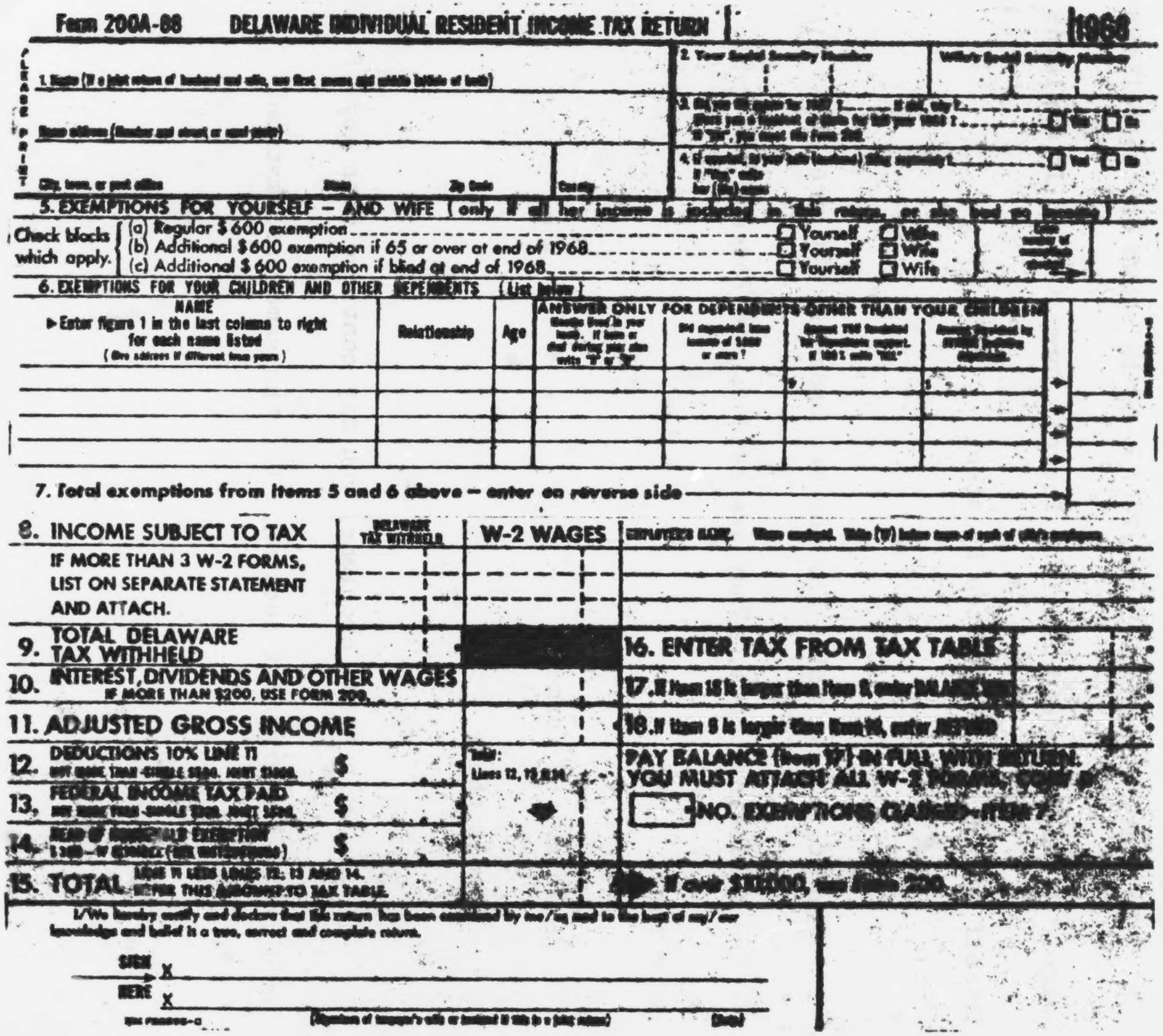
The State Tax Tables for incomes under $10000 are also shown on the following pages. They are read as the Federal Tax Tables were read

Examine the forms.

Discuss them.

If you wish to do problems, you may continue with any of those used in the Federal Tax section. Use the same information.

STATE TAX FORM (FRONT AND BACK)



Form 200A-68 **DELAWARE INDIVIDUAL RESIDENT INCOME TAX RETURN** 1968

PLEASE PRINT

1. Name [illegible]

Home address (Number and street or rural route)

City, town, or post office — State — Zip Code — County

2. Your Social Security Number — Wife's Social Security Number

3. [illegible] ☐ Yes ☐ No

4. [illegible] ☐ Yes ☐ No

5. EXEMPTIONS FOR YOURSELF — AND WIFE (only if all her income is included in this return, or she had no income)

Check blocks which apply.
(a) Regular $600 exemption ☐ Yourself ☐ Wife
(b) Additional $600 exemption if 65 or over at end of 1968 ☐ Yourself ☐ Wife
(c) Additional $600 exemption if blind at end of 1968 ☐ Yourself ☐ Wife

6. EXEMPTIONS FOR YOUR CHILDREN AND OTHER DEPENDENTS (List below)

NAME ▶ Enter figure 1 in the last column to right for each name listed (Give address if different from yours)	Relationship	Age	ANSWER ONLY FOR DEPENDENTS OTHER THAN YOUR CHILDREN [illegible]	[illegible]	[illegible]	[illegible]	
					$	$	▶
							▶
							▶
							▶

7. Total exemptions from items 5 and 6 above — enter on reverse side ▶

8. INCOME SUBJECT TO TAX	DELAWARE TAX WITHHELD	W-2 WAGES	EMPLOYER'S NAME [illegible]
IF MORE THAN 3 W-2 FORMS, LIST ON SEPARATE STATEMENT AND ATTACH.			
9. TOTAL DELAWARE TAX WITHHELD			16. ENTER TAX FROM TAX TABLE
10. INTEREST, DIVIDENDS AND OTHER WAGES IF MORE THAN $200, USE FORM 200.			17. If item 16 is larger than item 9, enter BALANCE [illegible]
11. ADJUSTED GROSS INCOME			18. If item 9 is larger than item 16, enter REFUND
12. DEDUCTIONS 10% LINE 11 [illegible] $		Total: Lines 12, 13 & 14	PAY BALANCE (item 17) IN FULL WITH RETURN. YOU MUST ATTACH ALL W-2 FORMS, [illegible]
13. FEDERAL INCOME TAX PAID [illegible] $		➡	☐ NO. EXEMPTIONS CLAIMED—ITEM 7
14. HEAD OF HOUSEHOLD EXEMPTION [illegible] $			
15. TOTAL LINE 11 LESS LINES 12, 13 AND 14. ENTER THIS AMOUNT TO TAX TABLE.			➡ If over $10,000, use Form 200.

I/We hereby certify and declare that this return has been examined by me/us and to the best of my/our knowledge and belief it is a true, correct and complete return.

SIGN HERE ▶ X ______
X ______
[illegible] (Signature of taxpayer's wife or husband if this is a joint return) (Date)

Little available

[redacted]

STATE OF DELAWARE
1968 TAX TABLE FOR INCOMES UNDER $10,000

To find your tax, locate the amount shown on Line 19, Page 1, Form 200, or on Line 15, Form 200A, in the Tax Table. Then read across to the appropriate column headed by number corresponding to the number of exemptions claimed. This is your total tax. Enter on Line 20A, Page 1, Form 200, or on Line 16, Form 200A.

AMOUNT		And the number of exemptions is							
At Least	*But Less Than*	1	2	3	4	5	6	7	8
0	650	0	0	0	0	0	0	0	0
650	700	1	0	0	0	0	0	0	0
700	750	2	0	0	0	0	0	0	0
750	800	3	0	0	0	0	0	0	0
800	900	4	0	0	0	0	0	0	0
900	1,000	5	0	0	0	0	0	0	0
1,000	1,100	7	0	0	0	0	0	0	0
1,100	1,200	8	0	0	0	0	0	0	0
1,200	1,300	10	1	0	0	0	0	0	0
1,300	1,400	11	2	0	0	0	0	0	0
1,400	1,500	13	4	0	0	0	0	0	0
1,500	1,600	14	5	0	0	0	0	0	0
1,600	1,700	16	7	0	0	0	0	0	0
1,700	1,800	18	8	0	0	0	0	0	0
1,800	1,900	20	10	1	0	0	0	0	0
1,900	2,000	22	11	2	0	0	0	0	0
2,000	2,100	24	13	4	0	0	0	0	0
2,100	2,150	26	14	5	0	0	0	0	0
2,150	2,200	27	15	6	0	0	0	0	0
2,200	2,250	28	16	6	0	0	0	0	0
2,250	2,300	29	17	7	0	0	0	0	0
2,300	2,350	30	18	8	0	0	0	0	0
2,350	2,400	31	19	9	0	0	0	0	0
2,400	2,450	32	20	9	0	0	0	0	0
2,450	2,500	33	21	10	1	0	0	0	0
2,500	2,550	34	22	11	2	0	0	0	0
2,550	2,600	35	23	12	3	0	0	0	0
2,600	2,650	36	24	12	3	0	0	0	0
2,650	2,700	37	25	13	4	0	0	0	0
2,700	2,750	39	26	14	5	0	0	0	0
2,750	2,800	40	27	15	6	0	0	0	0
2,800	2,850	42	28	16	6	0	0	0	0
2,850	2,900	43	29	17	7	0	0	0	0
2,900	2,950	45	30	18	8	0	0	0	0
2,950	3,000	46	31	19	9	0	0	0	0
3,000	3,050	48	32	20	9	0	0	0	0
3,050	3,100	49	33	21	10	1	0	0	0
3,100	3,150	51	34	22	11	2	0	0	0
3,150	3.200	52	35	23	12	3	0	0	0
3,200	3,250	54	36	24	12	3	0	0	0
3,250	3,300	55	37	25	13	4	0	0	0
3,300	3,350	57	39	26	14	5	0	0	0
3,350	3,400	58	40	27	15	6	0	0	0
3,400	3,450	60	42	28	16	6	0	0	0
3,450	3,500	61	43	29	17	7	0	0	0
3,500	3,550	63	45	30	18	8	0	0	0
3,550	3,600	64	46	31	19	9	0	0	0
3,600	3,650	66	48	32	20	9	0	0	0
3,650	3,700	68	49	33	21	10	1	0	0
3,700	3,750	70	51	34	22	11	2	0	0
3,750	3,800	72	52	35	23	12	3	0	0
3,800	3,850	74	54	36	24	12	3	0	0
3,850	3,900	76	55	37	25	13	4	0	0
3,900	3,950	78	57	39	26	14	5	0	0
3,950	4,000	80	58	40	27	15	6	0	0
4,000	4,050	82	60	42	28	16	6	0	0
4,050	4,100	84	61	43	29	17	7	0	0
4,100	4,150	86	63	45	30	18	8	0	0
4,150	4,200	88	64	46	31	19	9	0	0
4,200	4,250	90	66	48	32	20	9	0	0
4,250	4,300	92	68	49	33	21	10	1	0
4,300	4,350	94	70	51	34	22	11	2	0
4.350	4,400	96	72	52	35	23	12	3	0

260 [redacted]

[redacted]

STATE OF DELAWARE
1968 TAX TABLE FOR INCOMES UNDER $10,000

To find your tax, locate the amount shown on Line 19, Page 1, Form 200, or on Line 15, Form 200A, in the Tax Table. Then read across to the appropriate column headed by number corresponding to the number of exemptions claimed. This is your total tax. Enter on Line 20A, Page 1, Form 200, or on Line 16, Form 200A.

AMOUNT		And the number of exemptions is									
At Least	*But Less Than*	1	2	3	4	5	6	7	8	9	10
4,400	4,450	98	74	54	36	24	12	3	0	0	0
4,450	4,500	100	76	55	37	25	13	4	0	0	0
4,500	4,550	102	78	57	39	26	14	5	0	0	0
4,550	4,600	104	80	58	40	27	15	6	0	0	0
4,600	4,650	106	82	60	42	28	16	6	0	0	0
4,650	4,700	109	84	61	43	29	17	7	0	0	0
4,700	4,750	111	86	63	45	30	18	8	0	0	0
4,750	4,800	114	88	64	46	31	19	9	0	0	0
4,800	4,850	116	90	66	48	32	20	9	0	0	0
4,850	4,900	119	92	68	49	33	21	10	1	0	0
4,900	4,950	121	94	70	51	34	22	11	2	0	0
4,950	5,000	124	96	72	52	35	23	12	3	0	0
5,000	5,100	127	99	75	54	36	24	13	4	0	0
5,100	5,200	132	103	79	57	39	26	14	5	0	0
5,200	5,300	137	107	83	60	42	28	16	7	0	0
5,300	5,400	142	112	87	63	45	30	18	8	0	0
5,400	5,500	147	117	91	67	48	32	20	10	1	0
5,500	5,600	152	122	95	71	51	34	22	11	2	0
5,600	5,700	158	127	99	75	54	36	24	13	4	0
5,700	5,800	164	132	103	79	57	39	26	14	5	0
5,800	5,900	170	137	107	83	60	42	28	16	7	0
5,900	6,000	176	142	112	87	63	45	30	18	8	0
6,000	6,100	182	147	117	91	67	48	32	20	10	1
6,100	6,200	188	152	122	95	71	51	34	22	11	2
6,200	6,300	194	158	127	99	75	54	36	24	13	4
6,300	6,400	200	164	132	103	79	57	39	26	14	5
6,400	6,500	206	170	137	107	83	60	42	28	16	7
6,500	6,600	212	176	142	112	87	63	45	30	18	8
6,600	6,700	218	182	147	117	91	67	48	32	20	10
6,700	6,800	225	188	152	122	95	71	51	34	22	11
6,800	6,900	232	194	158	127	99	75	54	36	24	13
6,900	7,000	239	200	164	132	103	79	57	39	26	14
7,000	7,100	246	206	170	137	107	83	60	42	28	16
7,100	7,200	253	212	176	142	112	87	63	45	30	18
7,200	7,300	260	218	182	147	117	91	67	48	32	20
7,300	7,400	267	225	188	152	122	95	71	51	34	22
7,400	7,500	274	232	194	158	127	99	75	54	36	24
7,500	7,600	281	239	200	164	132	103	79	57	39	26
7,600	7,700	288	246	206	170	137	107	83	60	42	28
7,700	7,800	295	253	212	176	142	112	87	63	45	30
7,800	7,900	302	260	218	182	147	117	91	67	48	32
7,900	8,000	309	267	225	188	152	122	95	71	51	34
8,000	8,100	316	274	232	194	158	127	99	75	54	36
8,100	8,200	323	281	239	200	164	132	103	79	57	39
8,200	8,300	330	288	246	206	170	137	107	83	60	42
8,300	8,400	337	295	253	212	176	142	112	87	63	45
8,400	8,500	344	302	260	218	182	147	117	91	67	48
8,500	8,600	351	309	267	225	188	152	122	95	71	51
8,600	8,700	359	316	274	232	194	158	127	99	75	54
8,700	8,800	367	323	281	239	200	164	132	103	79	57
8,800	8,900	375	330	288	246	206	170	137	107	83	60
8,900	9,000	383	337	295	253	212	176	142	112	87	63
9,000	9,100	391	344	302	260	218	182	147	117	91	67
9,100	9,200	399	351	309	267	225	188	152	122	95	71
9,200	9,300	407	359	316	274	232	194	158	127	99	75
9,300	9,400	415	367	323	281	239	200	164	132	103	79
9,400	9,500	423	375	330	288	246	206	170	137	107	83
9,500	9,600	431	383	337	295	253	212	176	142	112	87
9,600	9,700	439	391	344	302	260	218	182	147	117	91
9,700	9,800	447	399	351	309	267	225	188	152	122	95
9,800	9,900	455	407	359	316	274	232	194	158	127	99
9,900	10,000	463	415	367	323	281	239	200	164	132	103

10,000 and over, use Computation Schedule

Complete These

A 1) Wilmington Wage tax is ______% ($\frac{1}{2}$

2) Tax paid on a home is called _____tax (property

3) $3.40 per $100 is the same as _____% (3.4

4) A_____ tax is used in almost all states except Delaware. (sales

5) The tax that everyone in the U.S. should pay the first of each year is the _____ tax. (income

6) You are allowed $______ for each dependent. (600

7) Six percent of 4.50 is ______. (.27

8) The price you get when you sell your house is the _____ value. (market

9) The surtax is about ______% (10

10) Your total income from all places is your ______ income. (gross

11) The standard deduction is _____% in income taxes. (10

12) A dependent is a person who receives over ____ of their support from you. ($\frac{1}{2}$

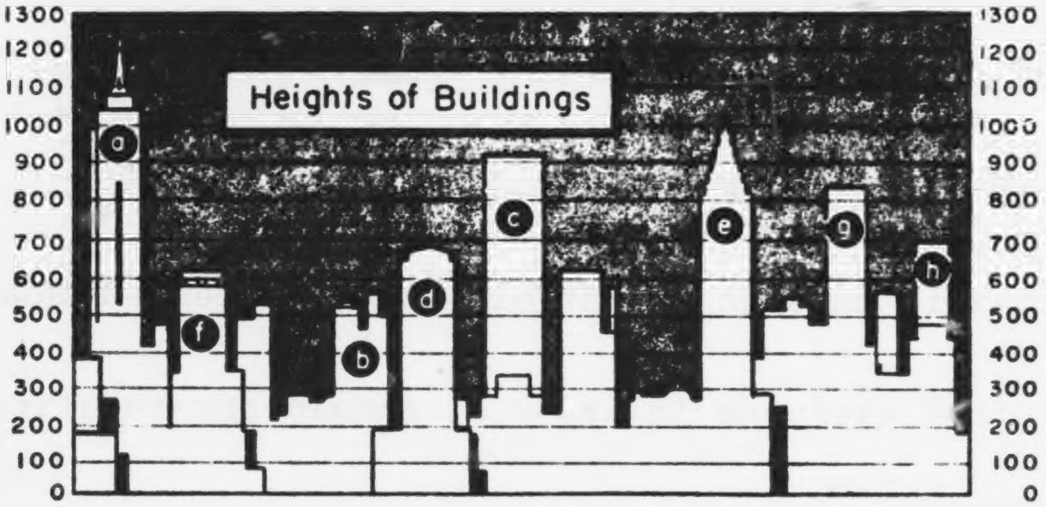
13) A gasoline tax is an _______ tax. (indirect

14) The value put on property for tax purposes is the ______ value. (assessed

15) Persons earning under $____ do not have to pay income tax. (600

GRAPHS

UNIT VI



Our Tallest Buildings

To the nearest hundred feet, tell the height of

a Empire State Building

b New York Central

c Bank of Manhattan

d Chanin Building

e Chrysler Building

f Waldorf Astoria

g RCA Building

h 500 Fifth Avenue

What does this picture tell you ?

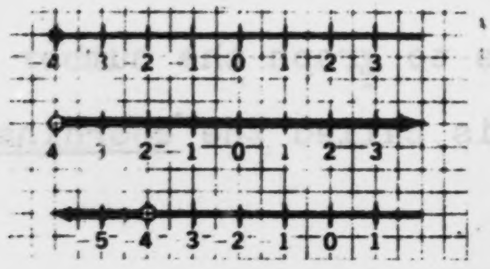
This is a graph. It shows by a picture some number facts we have to know. In this unit we will learn how to construct, read, and interpret different kinds of graphs.

"ONE PICTURE IS WORTH A THOUSAND WORDS"

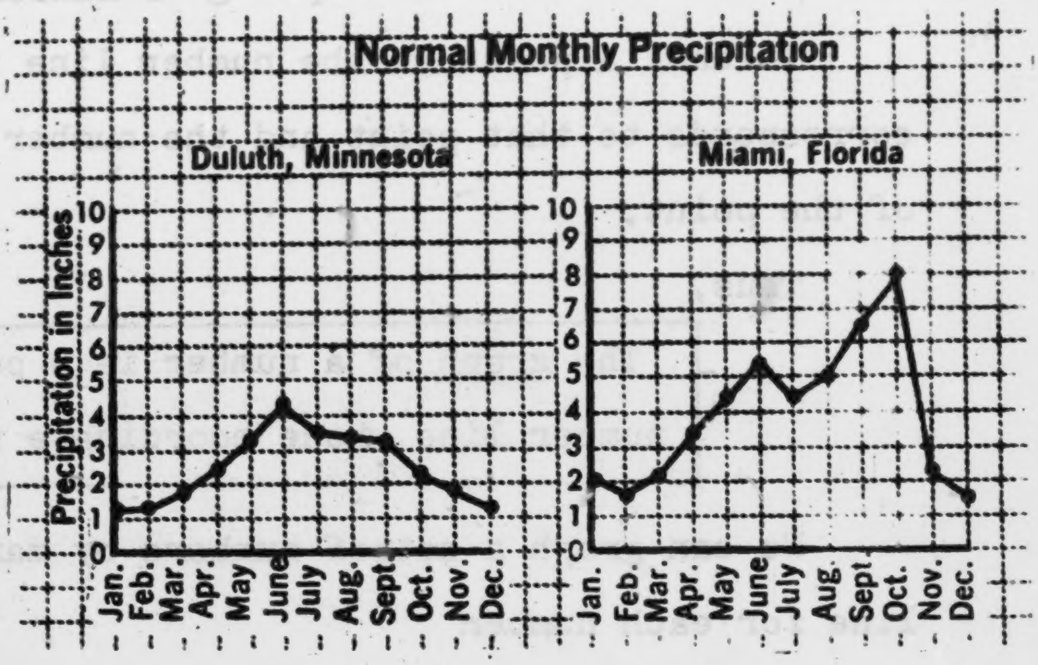
GRAPHS

There are many different kinds of graphs. They all do the same things. They allow us to assemble alot of information in one place, thus, enabling us at a glance to make a comparison of two or more quantities and to evaluate what is happening in a given situation.

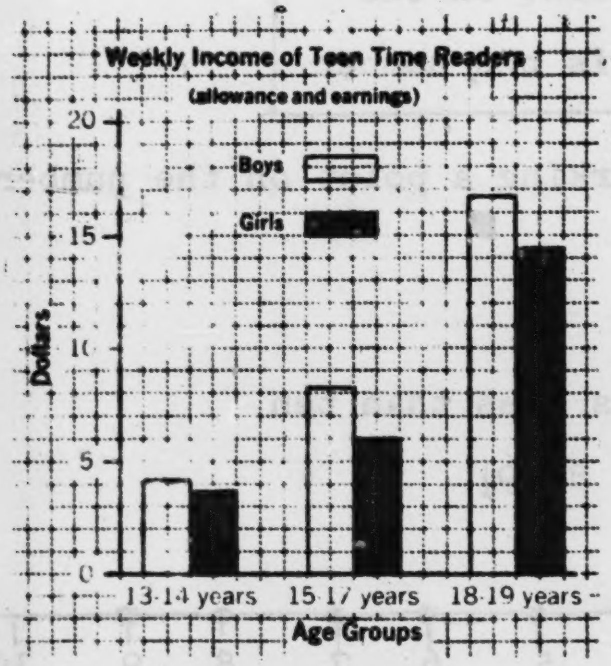
One may think of graphs as pictorial representations of numerical data. Below are examples of various kinds of graphs:



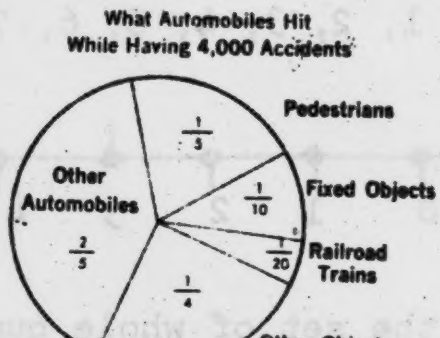
Number Line Graph



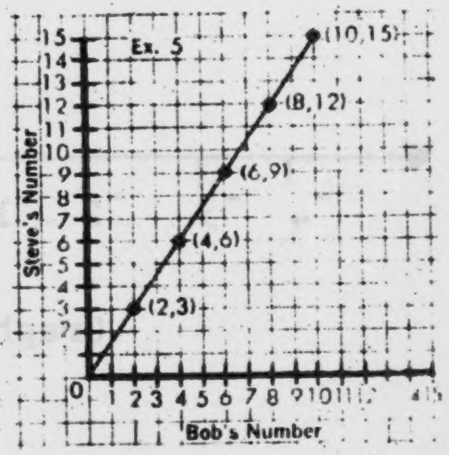
Broken Line Graph



Bar Graph



Circle Graph



Line Graph

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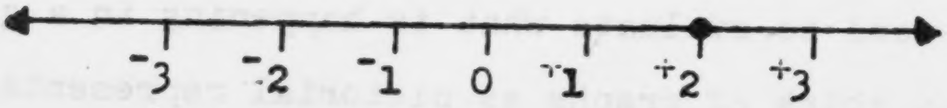
Graph of a Number

The graph of a number is a point on the number line.

The Graph of $^+2$



Graphing a number

To mark a point on the number line is to graph the number that corresponds to that point and the number is called the coordinate of the point.

Thus,

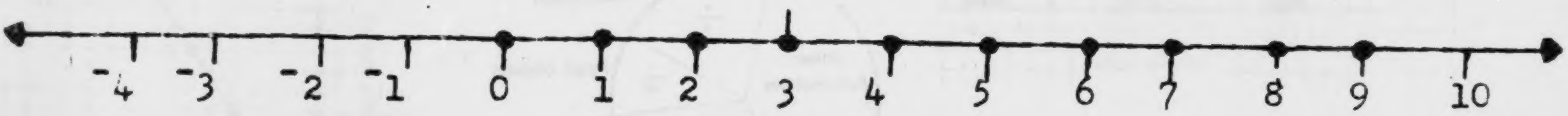
> The graph of a number is a point on the number line whose coordinate is the number.

We can graph a set of numbers by marking a point on the number line for each number.

Example:

Graph the set of whole numbers less than ten

{0, 1, 2, 3, 4, 5, 6, 7, 8, 9}



Graph of the set of whole numbers less than 10

Draw a number line for each and graph each:

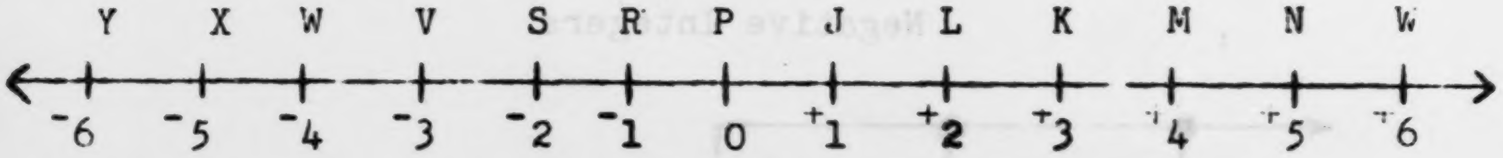
A 1) The whole numbers between 8 and 10.

2) The set of even numbers less than 14 and greater than -6.

3) The set of whole numbers greater than 0 and less than 9.

4) The set of odd numbers less than 0 and greater than -10.

Name the coordinate of the point given. Refer to the number line.



5) The point R. -1

6) The point K. 3

7) The point halfway from J to L. $1\frac{1}{2}$

8) The point halfway from P to W. K or 3

9) The point 2 units to the right of P. L or 2

10) The point one-third of the distance from P to W. L or 2

11) The whole numbers greater than 2 and less than $4\frac{1}{2}$ 3 and 4 or K and M

12) The whole numbers between P and M 1, 2, 3 or J, K, L

13) The point two-thirds of the distance from L to N. 4 or M

14) The whole numbers between $\frac{7}{3}$ and $\frac{72}{12}$ 4 and 5

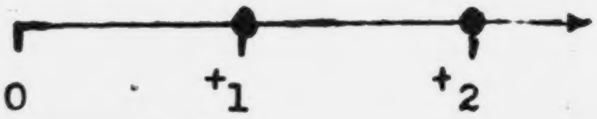
15) The directed numbers between X and W that are exactly divisable by 5.

empty set

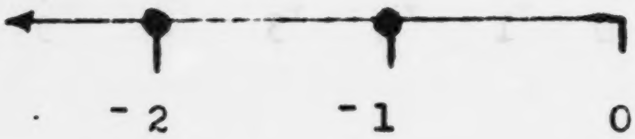
RATIONAL NUMBERS

The set of Rational Numbers is made up of the set of positive and negative integers and the set of positive and negative fractions, and zero.

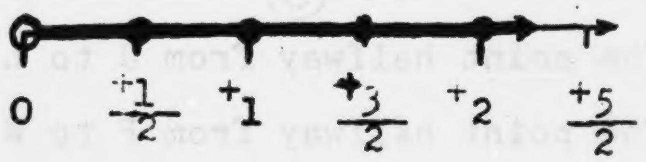
Positive Integers



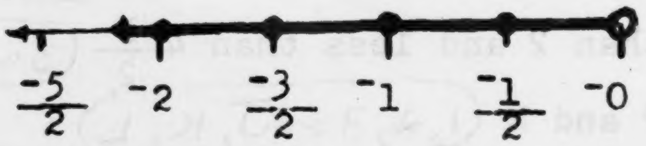
Negative Integers



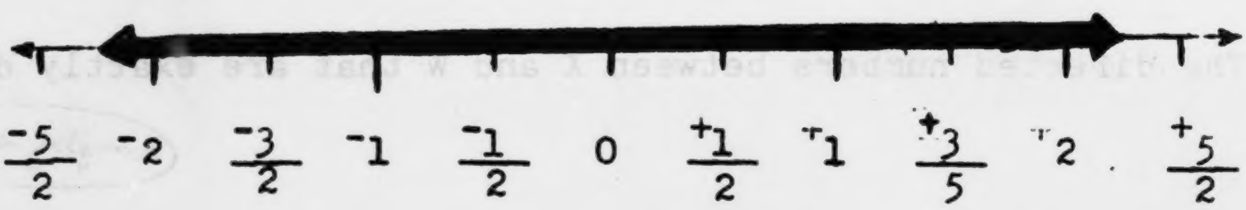
Positive Fractions



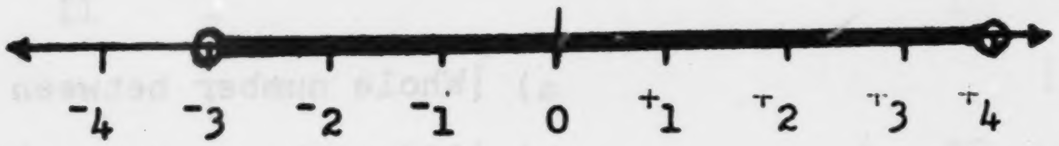
Negative Fractions



RATIONAL NUMBERS


-5/2
-2
-3/2
-1
-1/2
0
+1/2
+1
+3/5
+2
+5/2

How would you graph the set of rational numbers between $^{-}3$ and $^{+}4$?



This graph consists of all points between $^{-}3$ and $^{+}4$, meaning not to include $^{-}3$ and $^{+}4$.

ORAL

a) Is $^{+}3\frac{2}{7}$ included in this graph ?

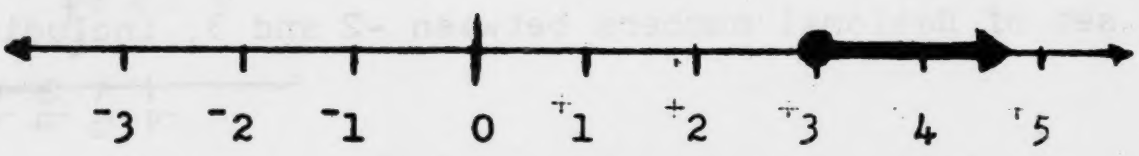
b) How about $^{-}2.3$?

c) Can you name some other numbers that are a part of this graph?

Note:

An open circle (O) indicates points not on the graph. A thick line indicates that all points on it belong to the graph.

How would you graph the set of rational numbers greater than or equal to 3.

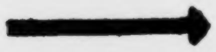


This graph consists of all points greater than 3 and includes 3.

a) Can you name some numbers that are close to 3 and on this graph ?

Note:

A darker arrow indicates that the graph continues indefinitely.

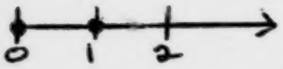


A Copy column I and Match column II with it:

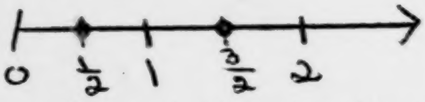
I	II
1) {0,1}	a) {Whole number between 1 and 2}
2) {1, 9, 25...}	b) {Odd number between 1 and 7, inclusive} ④
3) {0}	c) {Squares of odd numbers} ②
4) {1, 3, 5, 7}	d) {Even numbers between 2 and 8, inclusive} ⑤
5) {2, 4, 6, 8}	e) {The product of 15 and 3} ⑥
6) {45}	f) {zero} ③
	g) {The integers zero and one} ①

B Draw a graph of each:

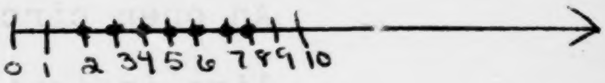
7) { 0, 1}



8) $\{\frac{1}{2}, \frac{3}{2}\}$

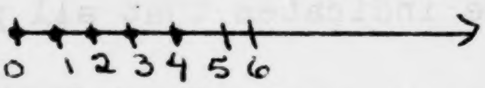


9) The whole numbers between 2 and 8 inclusive.

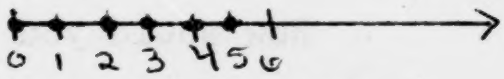


0 1 2 3 4 5 6 7 8 9 10

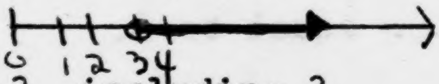
10) The whole numbers less than 5.



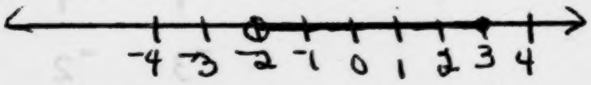
11) The whole numbers less than or equal to 5.



12) The set of Rational numbers greater than 3



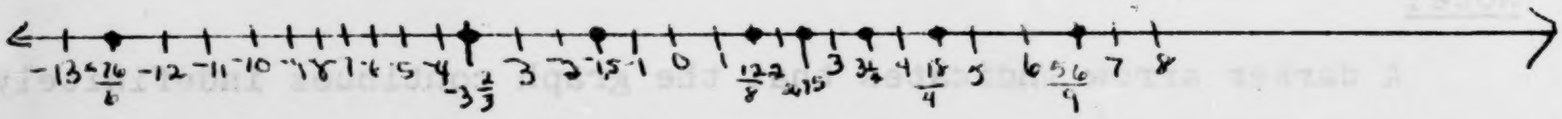
13) The set of Rational numbers between -2 and 3, including 3



C Draw a number line and locate the following points.

14) a) $\frac{12}{8}$ b) -1.50 c) $3\frac{1}{2}$ d) 2.75

e) $\frac{-76}{6}$ f) $-3\frac{2}{3}$ g) $\frac{18}{4}$ h) $\frac{56}{9}$



-13
-76/6
-12
-11
-10
-9
-8
-7
-6
-5
-4
-3 2/3
-3
-2
-1.5
-1
0
1
12/8
2
2.75
3
3½
4
18/4
5
6
56/9
7
8

Comparing Numbers

Signs of Inequality:

$$7 = 6 - 3$$

is a false statement. To change it to a true statement, we may use the symbol $\neq$, " is not equal to. "

$$7 \neq 6 - 3$$

Can you think of another inequality symbol we may use ?

$7 > 6 - 3$ read "7 is greater than $6 - 3$"

Another, inequality symbol is $<$, read, "is less than."

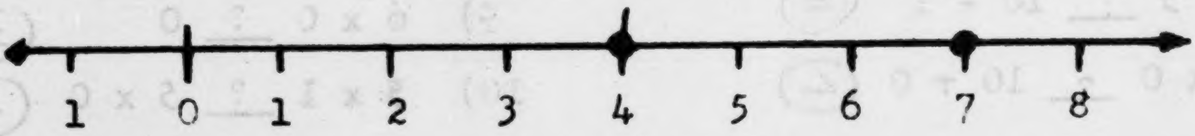
$$7 > 6 - 3 \text{ and } 6 - 3 < 7$$

They are both true statements and both give the same information.

Consider:

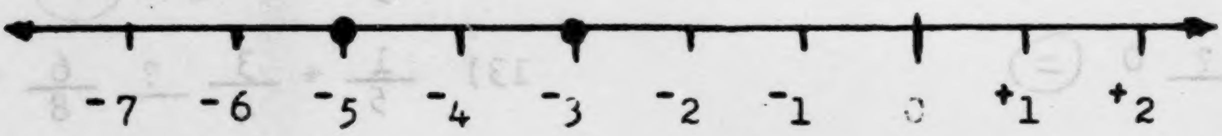
7 is greater than 4, written $7 > 4$

The graph of 4 is to the left of the graph of 7



Likewise $^-3$ is greater than $^-5$, written $^-3 > ^-5$

The graph of $^-5$ is to the left of the graph of $^-3$



Consider, this statement; y is between 1 and 7" where y represents some number.

It means y is greater than 1 and also y is less than 7

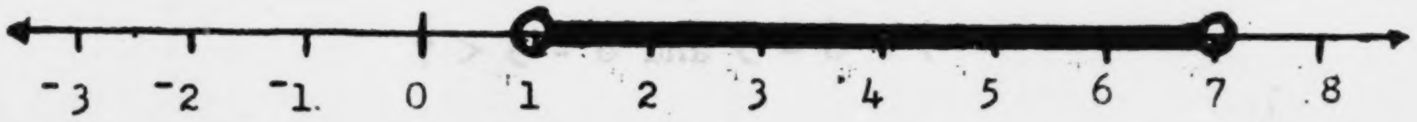
$y > 1$ and $y < 7$

y is greater than 1 and y is less than 7

This pair of statements can be put together

$$1 < y < 7$$

or graph it



A Make a true statement by replacing each blank space with the sign =, <, or >.

1) $4 + 5$? $10 - 1$ (=)

2) 13×0 ? $10 + 0$ (<)

3) 7 ? 7 (=)

4) 5 ? 6 (<)

5) 0 ? 0 (=)

6) $\frac{15}{3}$? $2 + 3$ (=)

7) $8 - 3$? $1 + 6$ (<)

8) $5 - 8$ $8 - 5$ (<)

9) 6×0 ? 0 (=)

10) 5×1 ? 5×0 (>)

11) $2\frac{1}{8}$? $1 + 1\frac{2}{6}$ (<)

12) $\frac{1}{3}$? $\frac{1}{6}$ (>)

13) $\frac{1}{5} + \frac{3}{4}$? $\frac{6}{8} + .2$ (=)

14) 65 ± 1 ? 66 (=)

15) $\frac{1}{3} + \frac{4}{6}$? $\frac{5}{9}$ (>)

16) 3 ? 3×0 (>)

B Copy each statement. Replace each blank space by any numeral that makes the resulting statement true.

Example:

$1 < \_\_\_ < 3$

$1 < \underline{\ 2\ } < 3$

17) $2 < \underline{\ ?\ } < 4$ 3

18) $10 < \underline{\ ?\ } < 13$ 11, 12

19) $12 < \underline{\ ?\ } < 13$ $12\frac{1}{2}$

20) $-1 > \underline{\ ?\ } > -3$ -2

21) $0 > \underline{\ ?\ } > 2$ empty set

22) $1.54327 > \underline{\ ?\ } > 1.53327$ 1.53827

23) $\sqrt{7} > \underline{\ ?\ } > \sqrt{6}$ $\sqrt{6.5}$

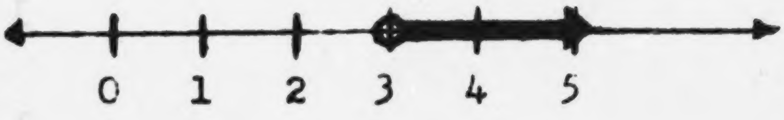
24) $\underline{\ ?\ } \times 0 = 0$ 0

25) $\frac{1.4867}{2.3864} < \underline{\ ?\ } < \frac{1.4857}{2.3764}$ $\frac{1.4857}{2.3814}$

Graphing Inequalities on the Number Line

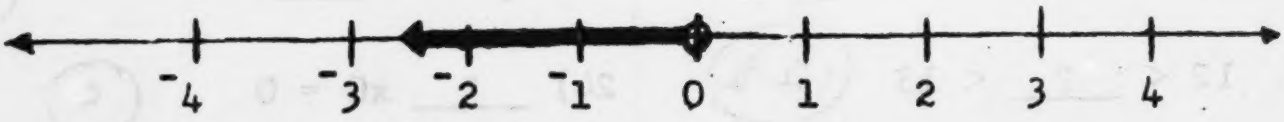
$x > 3$ read "x is greater than 3"

Graph:



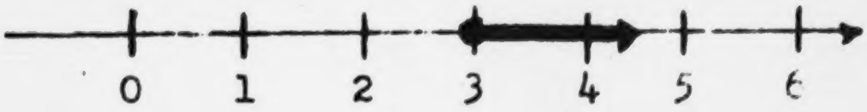
$x < 0$ read "x is less than zero"

Graph:



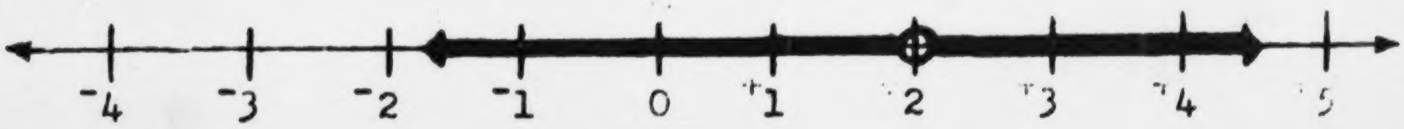
$x \geq 3$ read "x is greater than or equal to 3"

Graph:



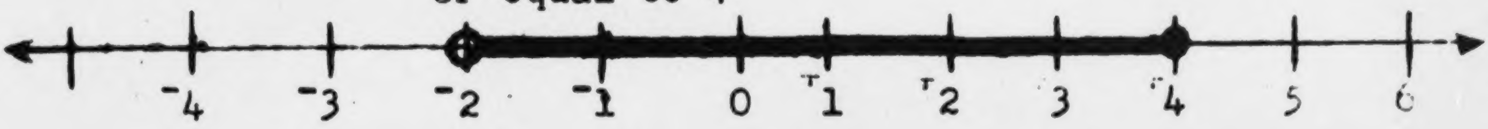
$x \neq 2$ read "x does not equal 2"

Graph:


-4 -3 -2 -1 0 1 2 3 4 5

$-2 < x \leq 4$ read "x is greater than -2 and less than or equal to 4"

Graph:


-4 -3 -2 -1 0 1 2 3 4 5 6

A Draw a number line and graph for each:

1) $x > 1$

2) $y < {}^-3$

3) $a \geq {}^-2$

4) $1 < x < 3$

5) $1 \leq x < 3$

6) $1 \leq x \leq 3$

B 7) {Numbers greater than $3\frac{1}{3}$ but less than 10}

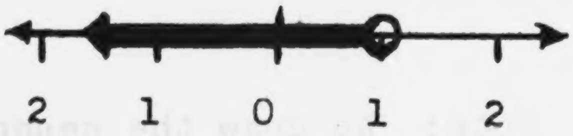
8) {The number between $4\frac{1}{2}$ and 5, including $4\frac{1}{2}$}

9) {The whole number less than or equal to 5}

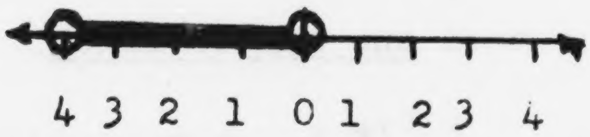
10) {The numbers less than 6 and greater than or equal to 2}

C Write a corresponding inequality which is pictured by each of the following graphs.

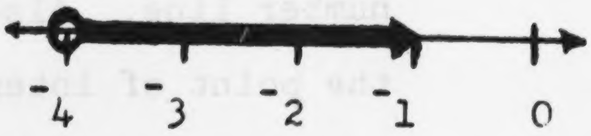
11)



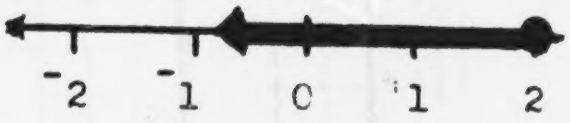
14)



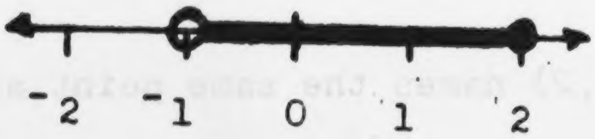
12)



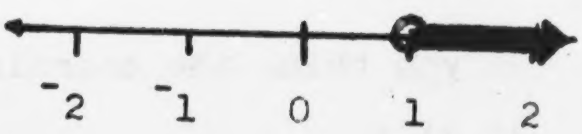
15)



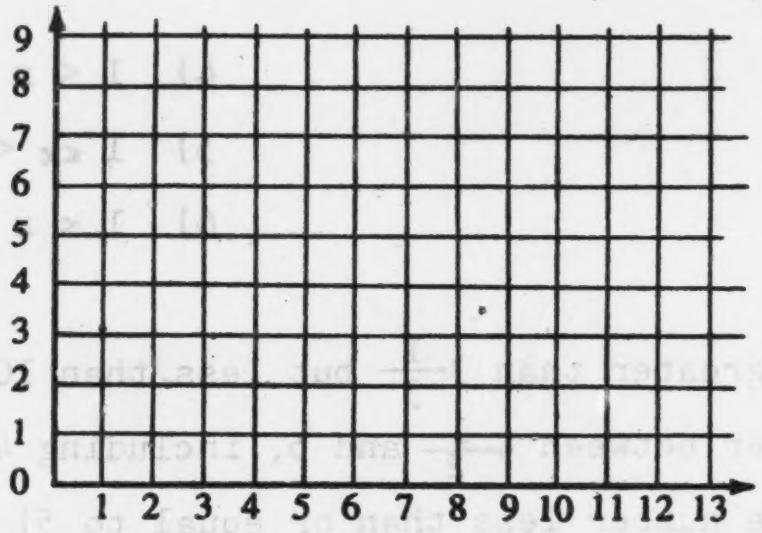
13)



16)



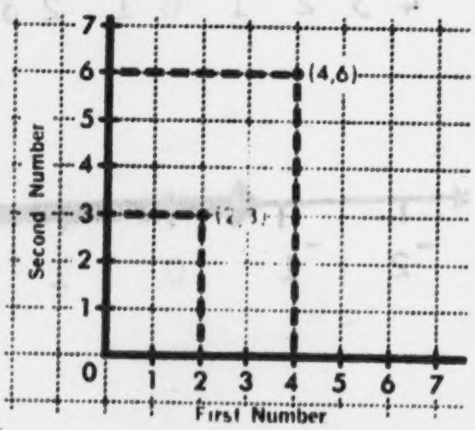
Below is a "Grid" which can be used to graph (plot) points.



9
8
7
6
5
4
3
2
1
0
1 2 3 4 5 6 7 8 9 10 11 12 13

When graphing a point designated by one number we used only one number line. How many number lines would you need to graph a point whose coordinates consists of two numbers ?

Consider the coordinates, (2,3) and (4,6). Since coordinates of this type consists of two numbers, its only natural that we would need two number lines.



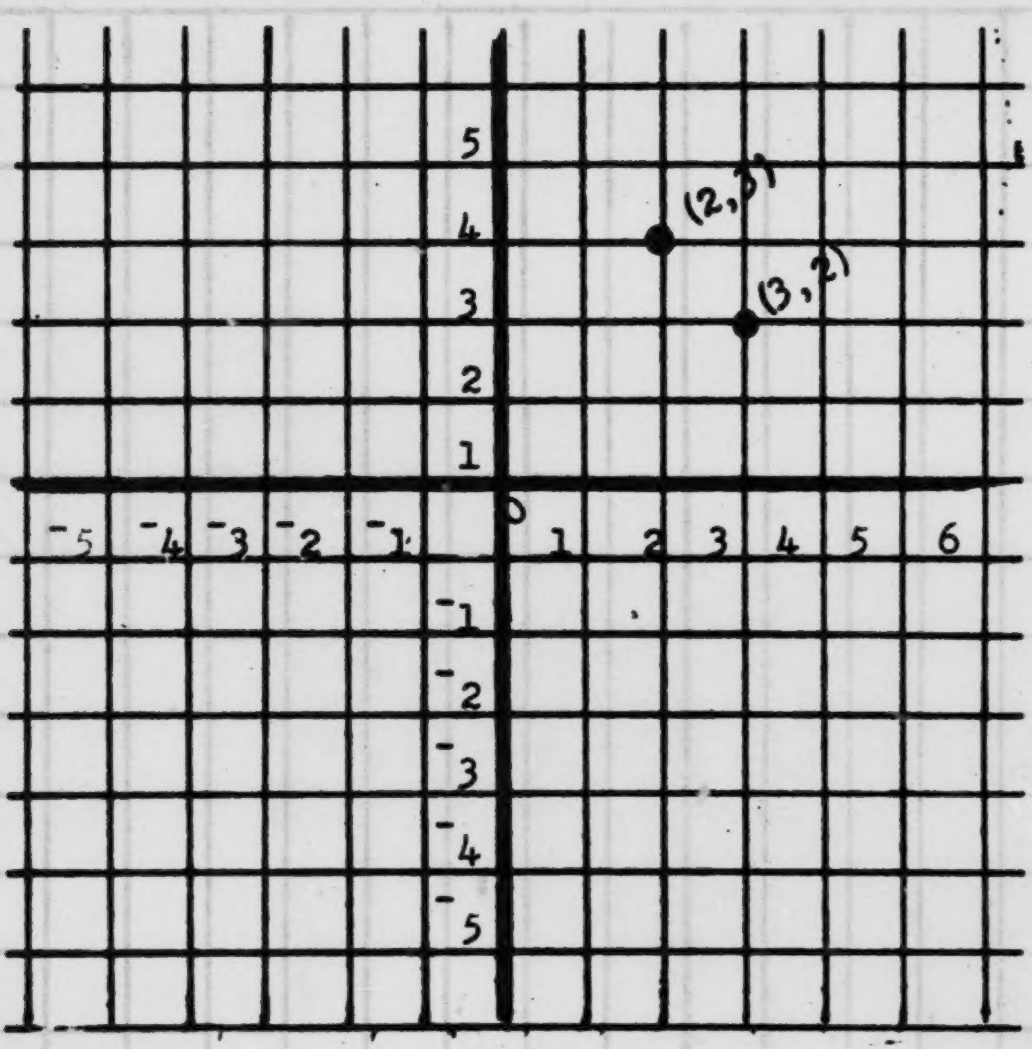
(4,6)
(2,3)
Second Number
First Number
0
1
2
3
4
5
6
7
1
2
3
4
5
6
7

Note: We draw the second number line perpendicular to the first number line. Also, we picked the point of intersection of the lines to be the 0 points of the two lines.

Do you think the coordinates (3,2) names the same point as coordinates (2,3) ?

dim
available

275 TD



You see pt. (2,3) and pt. (3,2) have two different graphs. So, the order in which we write the numbers for the coordinate of a point is important. Consequently, they are called "Ordered Pairs" of numbers.

A Copy the above intersecting number lines on a piece of paper and be careful to make the distance between integers points the same on both lines.

Now, draw the graph of the following points.

1) (4,2)
2) (2,4)
3) (4,5)
4) (-2,3)
5) (3,-2)
6) (4,5)
7) (4,0)
8) $(2, \frac{1}{2})$
9) (0,0)
10) $(\frac{1}{2}, \frac{1}{4})$
11) $(-4, \frac{3}{4})$
12) (1,1)
13) (0,3)
14) (-2, -3)

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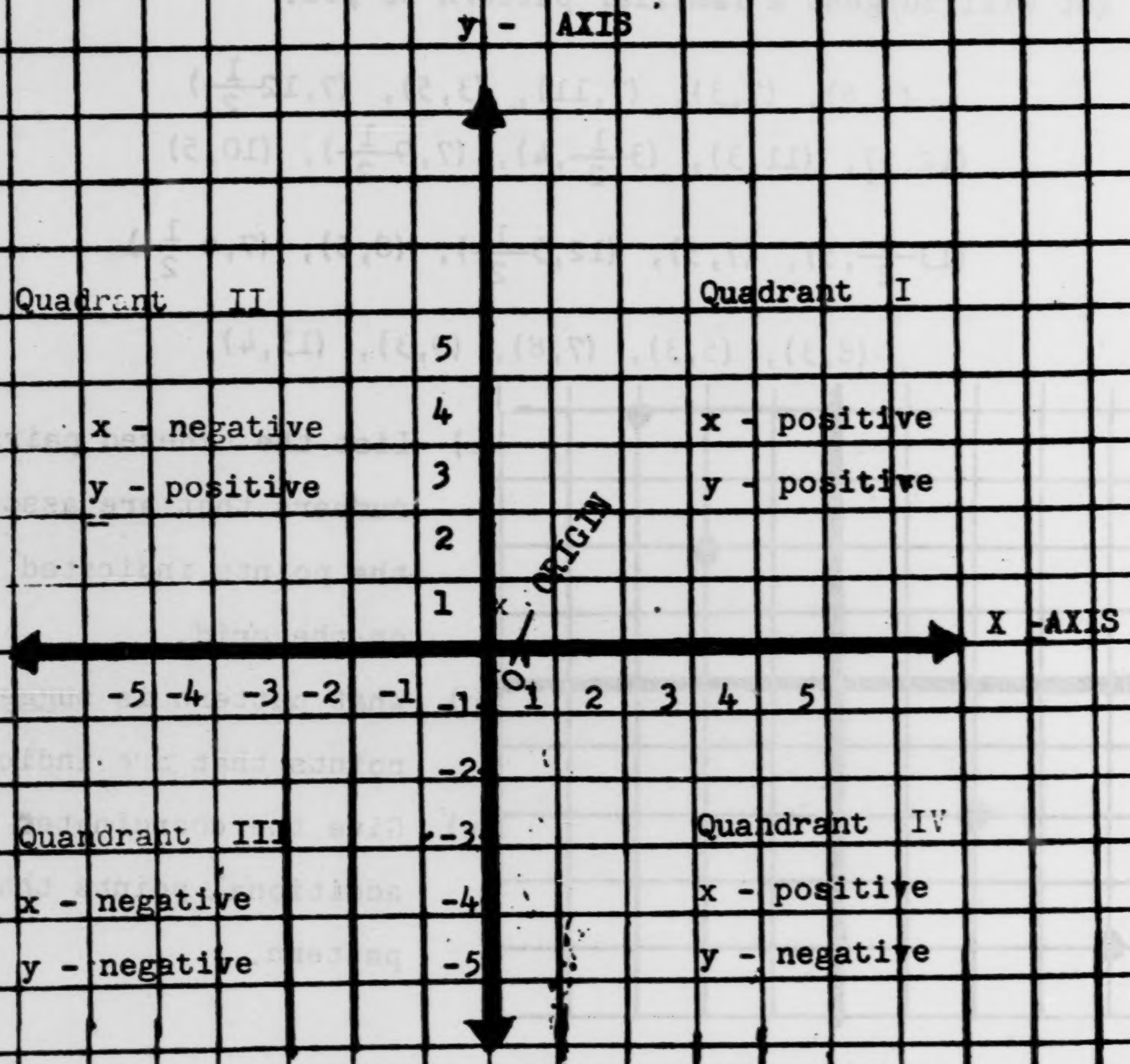
EVERYTHING HAS A NAME


y - AXIS
Quadrant II
x - negative
y - positive
Quadrant I
x - positive
y - positive
5
4
3
2
1
ORIGIN
X -AXIS
-5 -4 -3 -2 -1
1 2 3 4 5
-1
-2
-3
-4
-5
Quandrant III
x - negative
y - negative
Quandrant IV
x - positive
y - negative

Note: In an ordered pair, such as

(2,3)

2 is the x value and 3 is the y value.

(abscissa and ordinate respectively)

A 1) Plot the points associated with the ordered pairs given below. If the points are plotted correctly, the collection of dots that you get will suggest a familiar pattern to you.

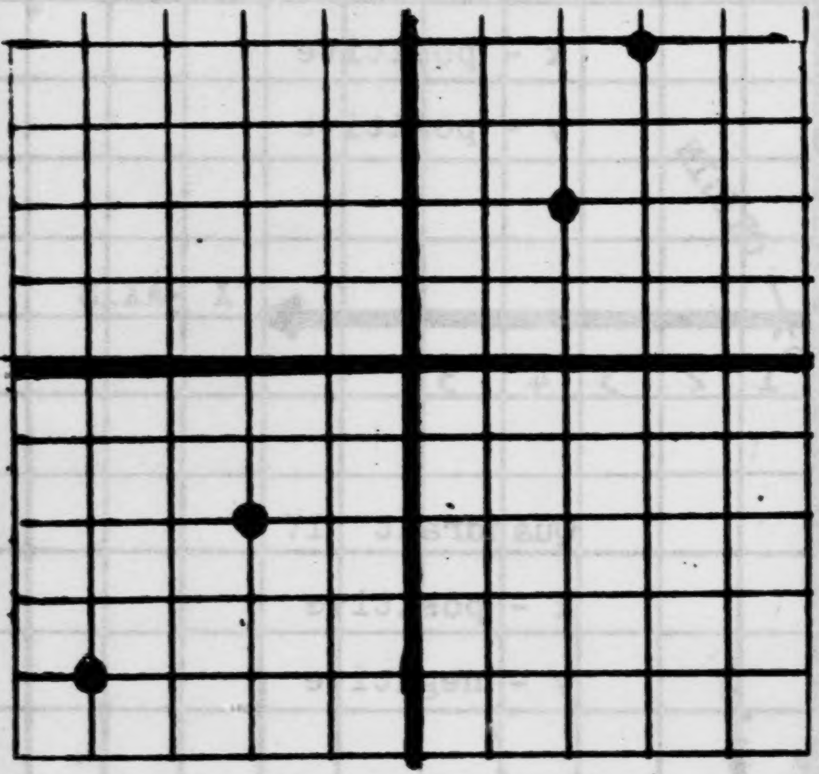
(5,5), (7,3), (7,11), (3,5), (7,$12\frac{1}{2}$)

(12,5), (11,3), ($3\frac{1}{2}$,4), (7,$9\frac{1}{2}$), (10,5)

($13\frac{1}{2}$,5), (7,5), (12,$3\frac{1}{2}$), (8,5), (7,$6\frac{1}{2}$)

(8,3), (5,3), (7,8), (9,3), (13,4)

2)



a) List the ordered pairs of numbers that are associated with the points indicated by dots on the grid.

b) What pattern is suggested by the points that are indicated.

c) Give the coordinates of some additional points that fit this pattern.

B 3) Draw the graph of each of these sets on separate grids.

a) {(1.5,3.0), ($\frac{^-3}{4}$,2), (0,2.5), (6, $\frac{^-1}{2}$)}

b) {($\frac{3}{4}$,2), ($^-4$,2), (1.5,2), ($\frac{^-1}{2}$,2), (0,2)}

c) {($^-3$,$^-3$), (-1,-1), (0,0), ($\frac{1}{2}$,$\frac{1}{2}$), (1,1), ($\frac{3}{2}$,$\frac{3}{2}$), (2,2)}

d) {(-1,-4), (-1,5), (-1,$-\frac{1}{2}$), (-1,0), (-1,2)}

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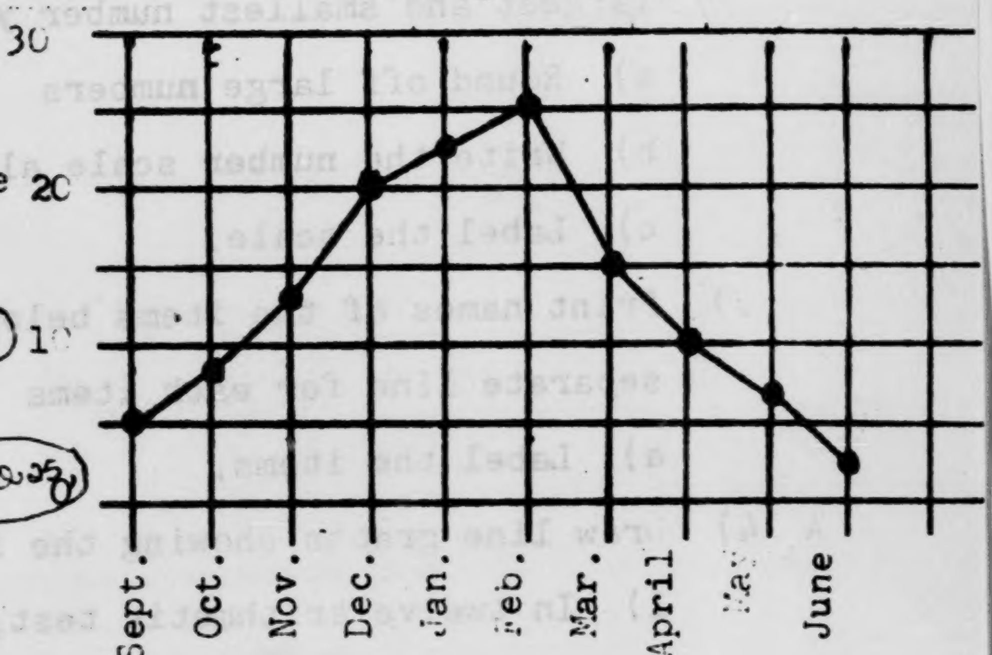
Broken Line Graph

The line graph is used to show changes and the relationship between quantities.

Lateness of a Wilmington School



Questions:

1) How many pupils late does the side of one small square indicate ? (5)

2) During what month does the lateness the greatest ? (Feb)

3) How many pupils were late each month ?

Sept 5, Oct 8, Nov 12, Dec 20, Jan 22, Feb 25, Mar 15, Apr 10, May 7, June 3

Note:

Quantity (horizontal scale) — months of the year

Quantity (vertical scale) — number of pupils late

4) What are the various parts of the above line graph ?

We can look at this graph and in a glance get a "total picture" of "Lateness" at the Wilmington school.

) What are some relationships that you see ?

Construction procedures (Broken Line Graph)

1) Draw a horizontal guide line near the bottom of the grid and a vertical guide line near the left.

2) Select a convient scale for the related numbers. Look at the largest and smallest number you will use.
    a) Round off large numbers
    b) Write the number scale along one of the guide lines.
    c) Label the scale.

3) Print names of the items below the other guide line, using a separate line for each items
    a) Label the items.

A 4) Draw line graphs showing the following data:
    1) In twelve arithmetic test, each containing 20 problems, John solved 8, 10, 13, 15, 12, 11, 14, 17, 16, 19, 18, and 20 correctly:

B Show on a broken-line graph beginning with January the average monthly temperature in Wilmington:

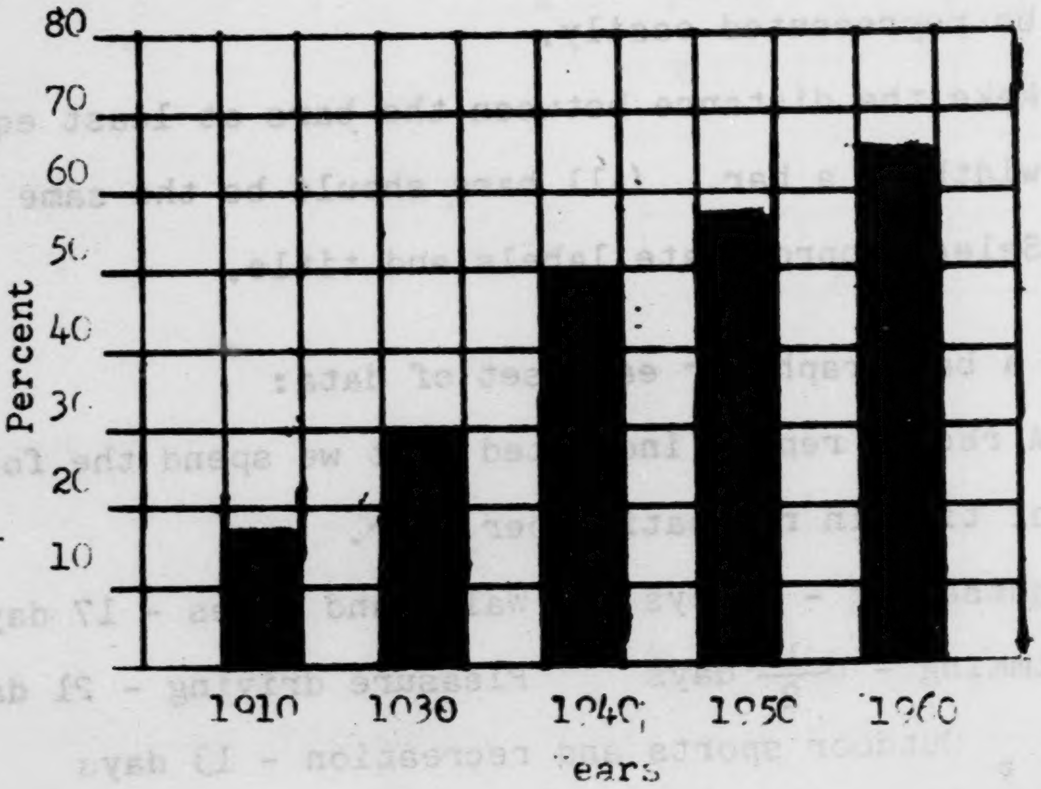
54°, 56°, 65°, 69°, 75°, 81°, 83°, 83°, 80°, 73°, 63°, 56°

Bar Graph

Study the graph and answer these questions:

Percent of 18-year old

H.S. Graduates - U.S.



Questions:

1) To the nearest percent, what percent of 18-year olds graduated from high school in the years shown ? 1920, 19%, 1930, 30%, 1940, 50%, 1950, 58%, 1960, 65%

2) In which year was the percent the greatest ? 1960

3) In which year was the percent the smallest ? 1920

4) Does a given distance on the horizontal axis represent a certain number of years ? yes

5) Does a given distance on the vertical axis represent a certain percent ? yes

6) Would the graph be just as effective if it were arranged so that the bars were horizontal instead of vertical ? yes

7) Do you have any questions ?

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Construction procedure: (Bar Graph)

1) Round off each number to at least the nearest hundreds.
2) Decide whether the bars should be vertical or horizontal.
3) Choose a convenient scale so that the largest quantity can be represented easily.
4) Make the distance between the bars at least equal to the width of a bar. (All bars should be the same width.)
5) Select appropriate labels and title.

A Construct a bar graph for each set of data:

1) A recent report indicated that we spend the following amounts of time in recreation per year.

Sightseeing - 6 days Walks and hikes - 17 days

Swimming - $6\frac{1}{2}$ days Pleasure driving - 21 days

Outdoor sports and recreation - 13 days

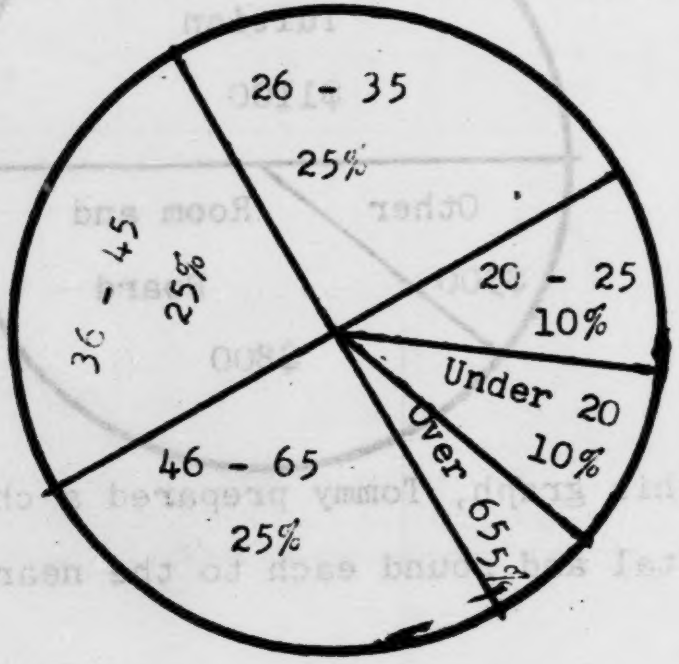
2) The length of time for a person on an average salary to earn enough to pay for certain commodities is indicated for 1950 and 1965.

Commodity	Earning time required	
	1950	1965
1 quart of milk	8 minutes	6 minutes
1 loaf of bread	6 minutes	6 minutes
1 dozen eggs	26 minutes	18 minutes
1 haircut (men)	43 minutes	48 minutes
1 house dress	1 hr. 48 min.	1 hr. 39 min.
1 pair shoes	5 hrs. 43 min.	4 hrs. 30 min.
1 man's suit	27 hrs. 35 min.	29 hrs. 10 min.

Circle Graph

A circle graph is used to compare the parts of a whole with each other and with the total. The size of each section depends on the angle at the center of the circle. This angle is called a Central Angle.

Percent of Drivers According to Age



This graph shows that 10% of the drivers are under 20 years of age, the central angle of this sector contains 10% of the 360 degrees around the center of the circle,

or

$$\text{Since } 10\% = \frac{10}{100}$$

$$\frac{10}{100} \times 360 = 36°$$

Compute the number of degrees in each of the remainding sectors.

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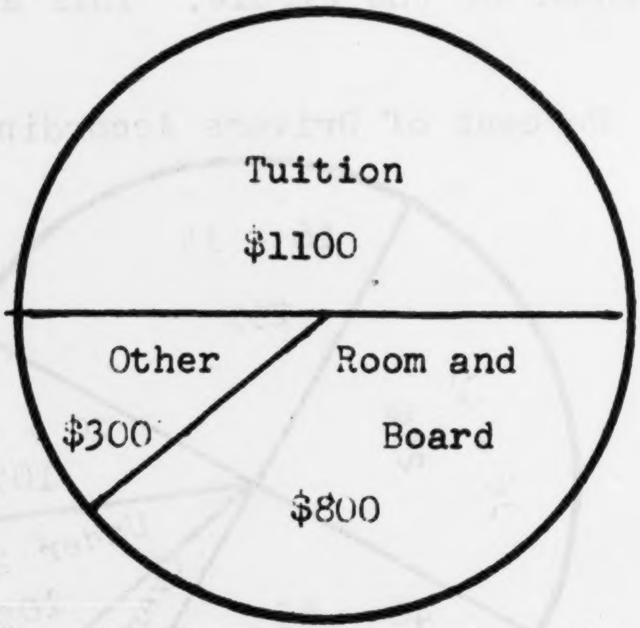
Tommy is planning to go to a private vocational technical school after graduation from high school. The cost of the school is estimated at $2200 per year. Tommy prepa red this graph

Cost of Voc. Tech. Sch.



In preparing his graph, Tommy prepared a chart (listing what of each was of the total and round each to the nearest whole percent)

Item	Cost	Percent
Room Board	800	36%
Tuition	1100	50%
Other Expenses	300	14%
	$2200	100%

Each sector of the graph must be equal to the same percent of the total area as the item is of the total cost. Then the angle of the sector representing room and board is 30% of 360°.

Note:

The sum of the three sector (degrees) should add up to 360 before the measures are rounded.

A **Copy and complete this chart:**

Item	Cost	Percent	Degrees
Room and board	800	36%	130°
Tuition	1100	50%	180°
Other expenses	300	14%	50°

Draw a circle and use a protractor to determine the angles at the center.

Draw in the radii to define the sectors.

Check your graph with Tommy's.

B A census report showed the following information with regard to money income and the school of the head of the family.

Construct three circle graphs to show these facts:

	Annual Income		
Schooling, head of family	Under $5000	$5000-$9999	Over $10000
8 years, or less	59%	35%	6%
High school graduates	38%	52%	10%
College, 4 or more years	16%	52%	32%

C 3) Collect some data about your class or school that can be shown on a circle graph.

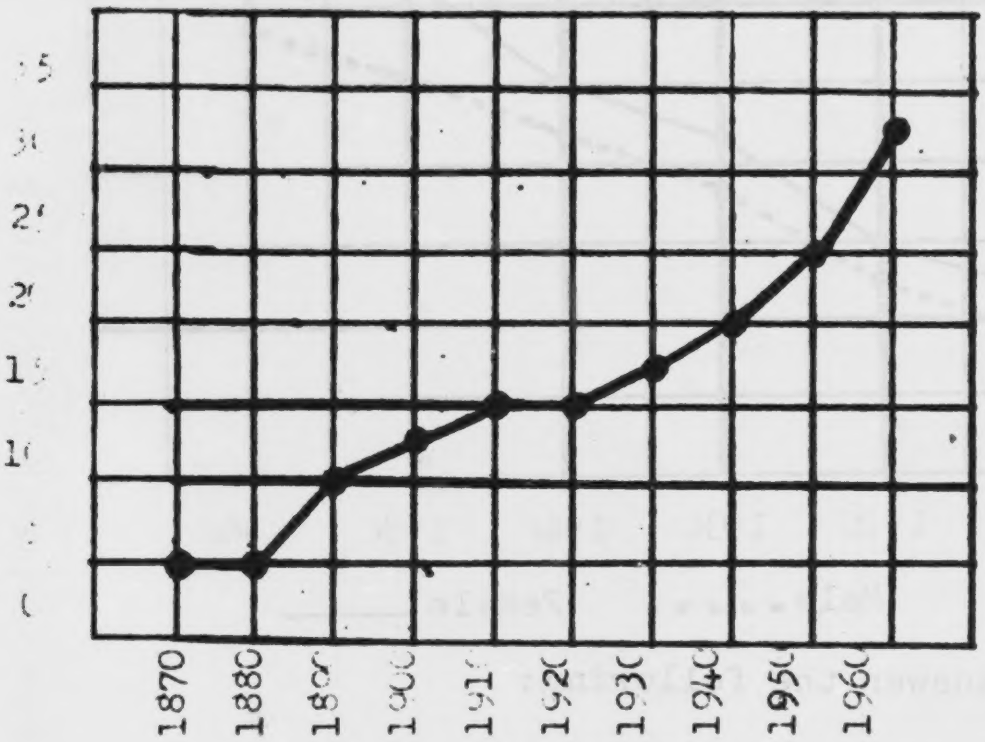
For example: (Pick one or make up one)

a) Results of a recent test or marking period.
b) Favorite hobbies among members of your class.
c) How students spend a typical school day.
d) Enrollment by grades.
e) Favorite Female vocalist (3 choices)

(Make a chart of data collected)

Reading and Interpreting Graphs

Often, a person will read into graph information that is not there.


Women Workers as
a Percent of all Workers

Consider the following statement:

1) Between 1870 and 1960 the percent of employed women steadily increased. (This statement is true because the percent value can actually be read from the graph 1970 - % = 15%; 1660 - % = 2

2) The percent of women workers will be greater in 1970 than was in 1960. ("Probably True" The person should have said "the percent will probably be greater. Although the % has been steadily **rising** over the last 90 years something unforseen may occur causing a dip in the graph).

3) The percent of women workers in 1945 was less than that in 1950. ("Was probably less" - The person is trying to determine what happened during a year that fell between points).

4) A woman's place is in the home, not at work. (A statement such as this is purely a matter of personal opinion and should not be drawn on the basis of this graph).

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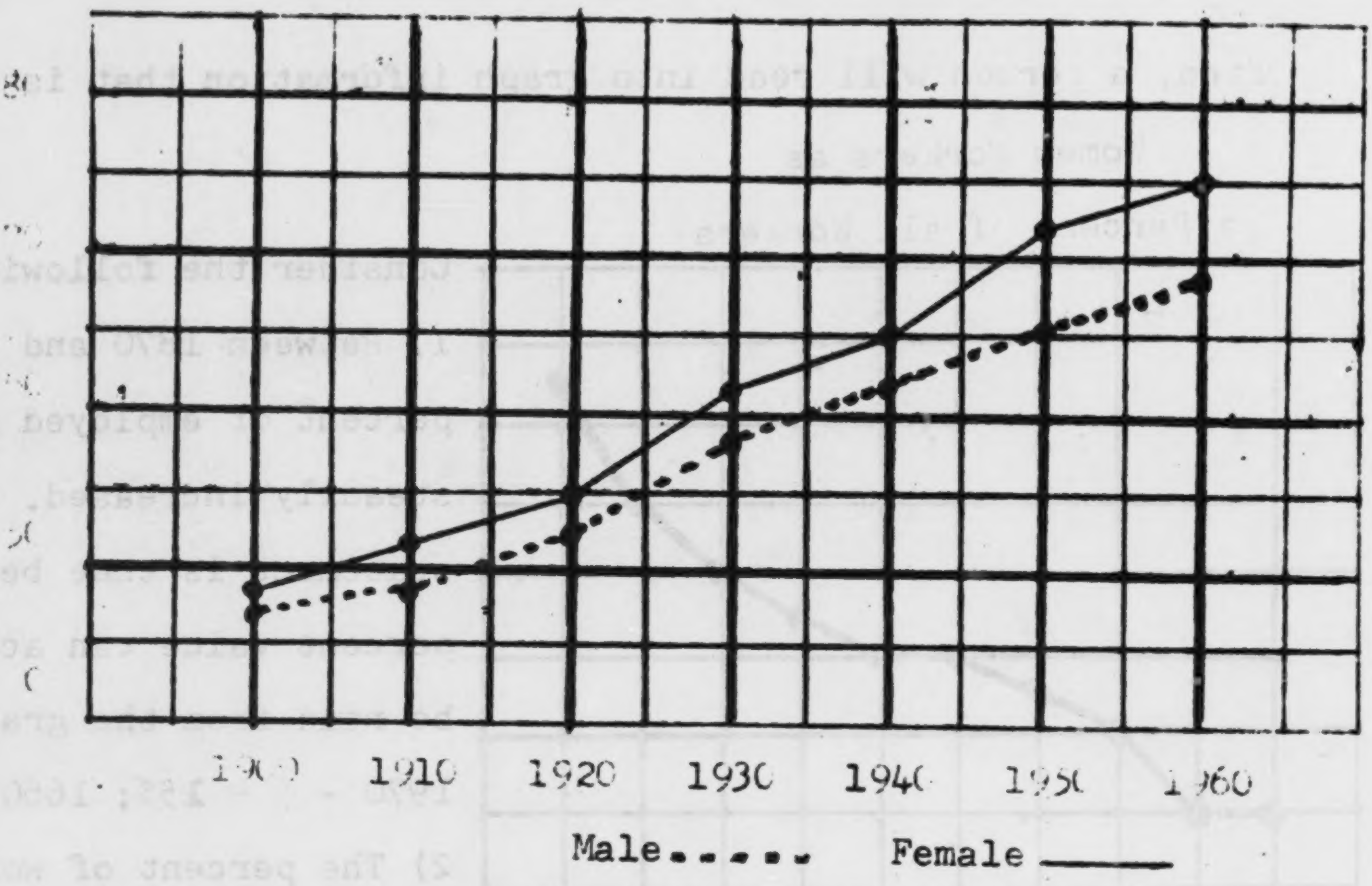
Life Expectancy



A Use the above graph to answer the following:

1) Write three statements that are true.

2) Write three statements that are false.

3) Write three statements that probabily are true.

4) Write three statements that probabily are false.

5) Write three statements relating men and women that could not be based on the graph.

How 70 million Americans were Employed

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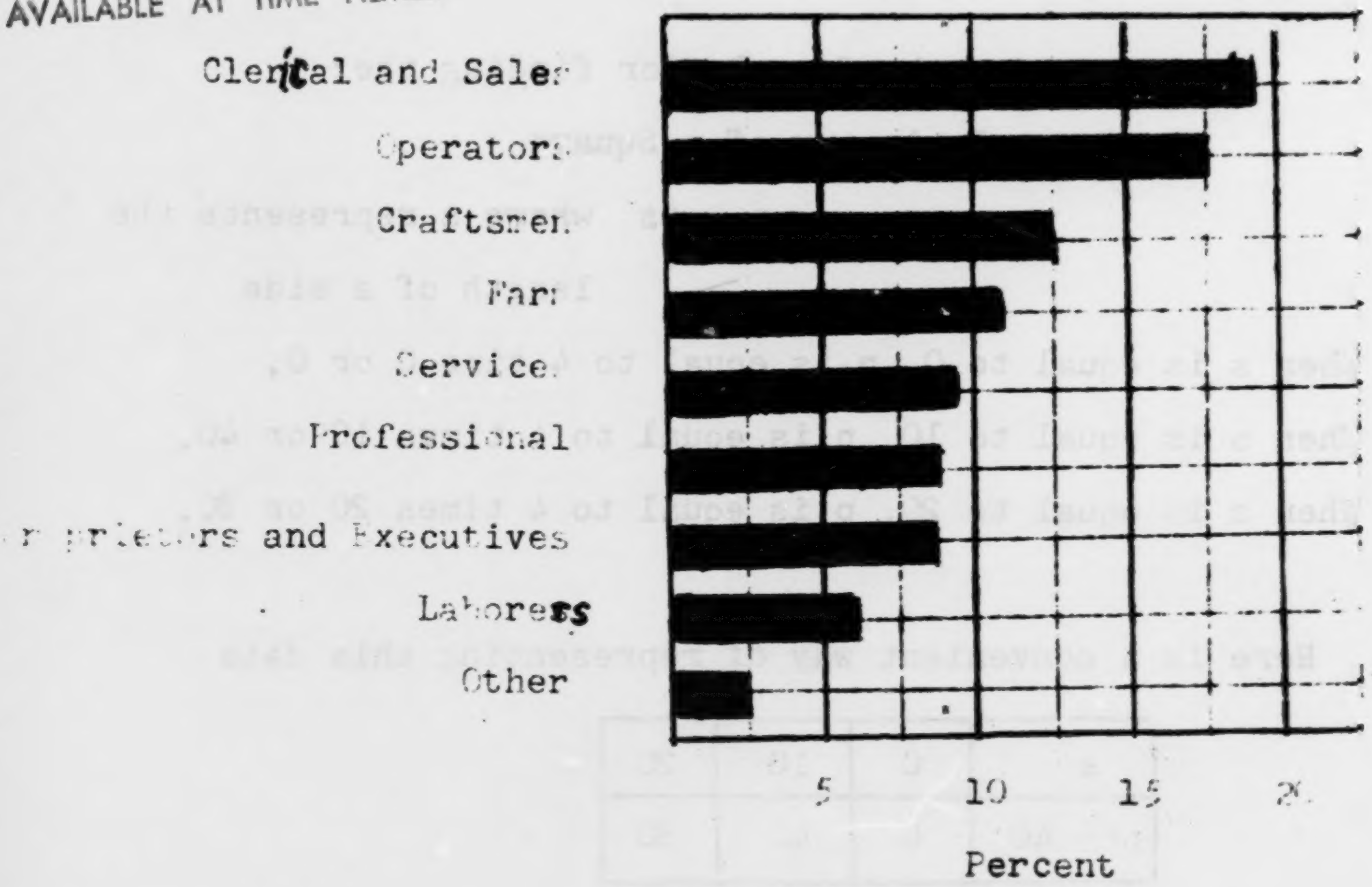


Answer each question using the graph as a source of information.

1) What does the horizontal scale show ?

2) What does the vertical scale show ?

3) What does each small unit on the horizontal scale represent ?

4) If the graph represents 70 million employed people,

   a) How many are engaged in farm work ?

   b) How many are engaged as craftsmen ?

5) What percent of those employed are services ?

6) Which field would you like to be employed in ?

To Teacher: The teacher can collect the answer to No. 6 and have the students graph the data.

Graphing Formulas

A formula containing only two variables can be represented in the form of a line graph.

Consider the formula for finding the:

Perimeter of a Square

p = 4s where s represents the length of a side

When s is equal to 0, p is equal to 4 time 0 or 0.

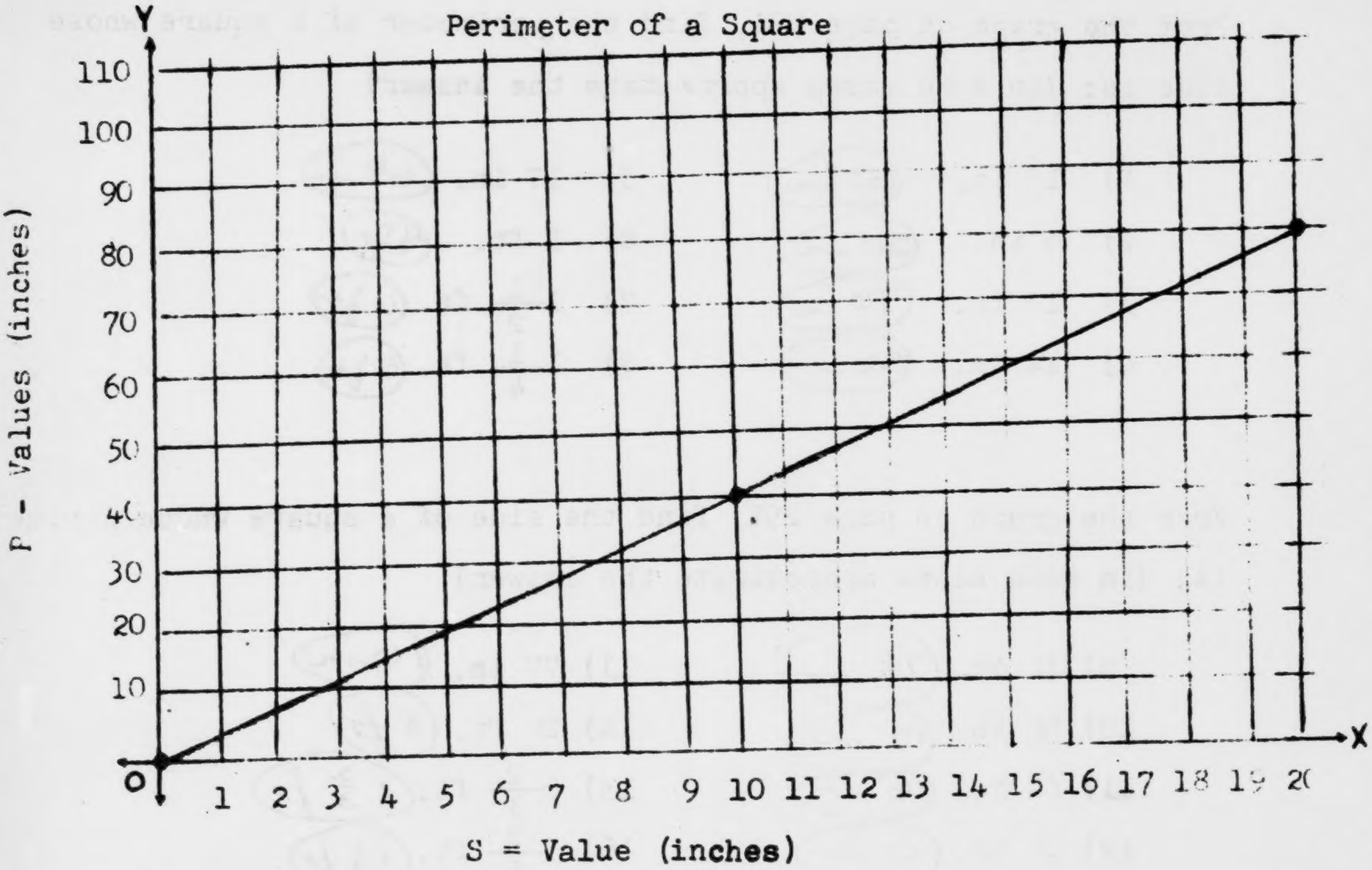
When s is equal to 10, p is equal to 4 times 10 or 40.

When s is equal to 20, p is equal to 4 times 20 or 80.

Here is a convenient way of representing this data.

s	0	10	20
p = 40	0	40	80

This is called a Table of Values



On the grid we let the y - axis represent the perimeter and the x - axis represent the **length** of a side and points representing the number pairs in the table, (0,0), (10,40) and (20,80) are located on the grid.

The graph of the formula p = 4s is a straight line.

From this graph we can find the primeter of any square whose side is equal in length to a number on the x - axis.

Also, we can find the length of a side of any square whose perimeter is one of the numbers of the y - axis.

A From the graph on page 291, find the perimeter of a square whose side is: (in some cases approximate the answer)

1) 15 in. 60 in
2) 5 in. 20 in
3) 19 in. 76 in
4) 14 in. 56 in
5) 17 in. 68 in
6) 1 ft. 4 ft
7) $1\frac{1}{2}$ ft. 6 ft
8) $1\frac{1}{4}$ ft. 5 ft

B From the graph on page 291, find the side of a square whose perimeter is: (in some cases approximate the answer)

9) 30 in. $7\frac{1}{2}$ in
10) 60 in. 15 in
11) 64 in. 16 in
12) 40 in. 10 in
13) 77 in. 16 in
14) 20 ft. 5 ft
15) $6\frac{2}{3}$ ft. $1\frac{2}{3}$ ft
16) $5\frac{2}{6}$ ft. $1\frac{1}{3}$ ft

C The price of a certain grade of gasoline is 25¢ a gallon. The cost (c) in dollars of any number (n) of gallons at this price is expressed by the formula $c = .25n$

a) Make a table of value, using $n = 0, 8$, and 15;
b) Draw a graph representing this formula.

Let each division on the x - axis represent 1 gallon

and each division of the y - axis represent 25¢.

From the graph (problem 17, page 292) find the cost of:

18) 9 gal. 2.25 19) 13 gal. 117 20) 7 gal. 63

From the same graph, find how many gallons can be purchased for:

21) \$1.50 7 22) \$3.50 14 23) \$2.75 11

24) If a car is traveling at an average speed of 60 miles an hour, the distance in miles that is covered in any number of hours is expressed by the formula $d = 60t$ where d represents distance and t represents time in hours.

a) Make a table of values, using $t = 0$, $2\frac{1}{2}$ and 5

b) Draw a graph representing the formula $d = 60t$

Let each division on the x - axis represent $\frac{1}{4}$ hr. and each division of the y - axis represent 10 miles.

From the graph what is the distance traveled in:

25) 2 hr. 120 26) $1\frac{1}{2}$ hr. 90 27) $3\frac{1}{2}$ hr. 210 28) 3 hr. 180 29) $1\frac{3}{4}$ hr. 105

From the graph what is the number of hours required to go:

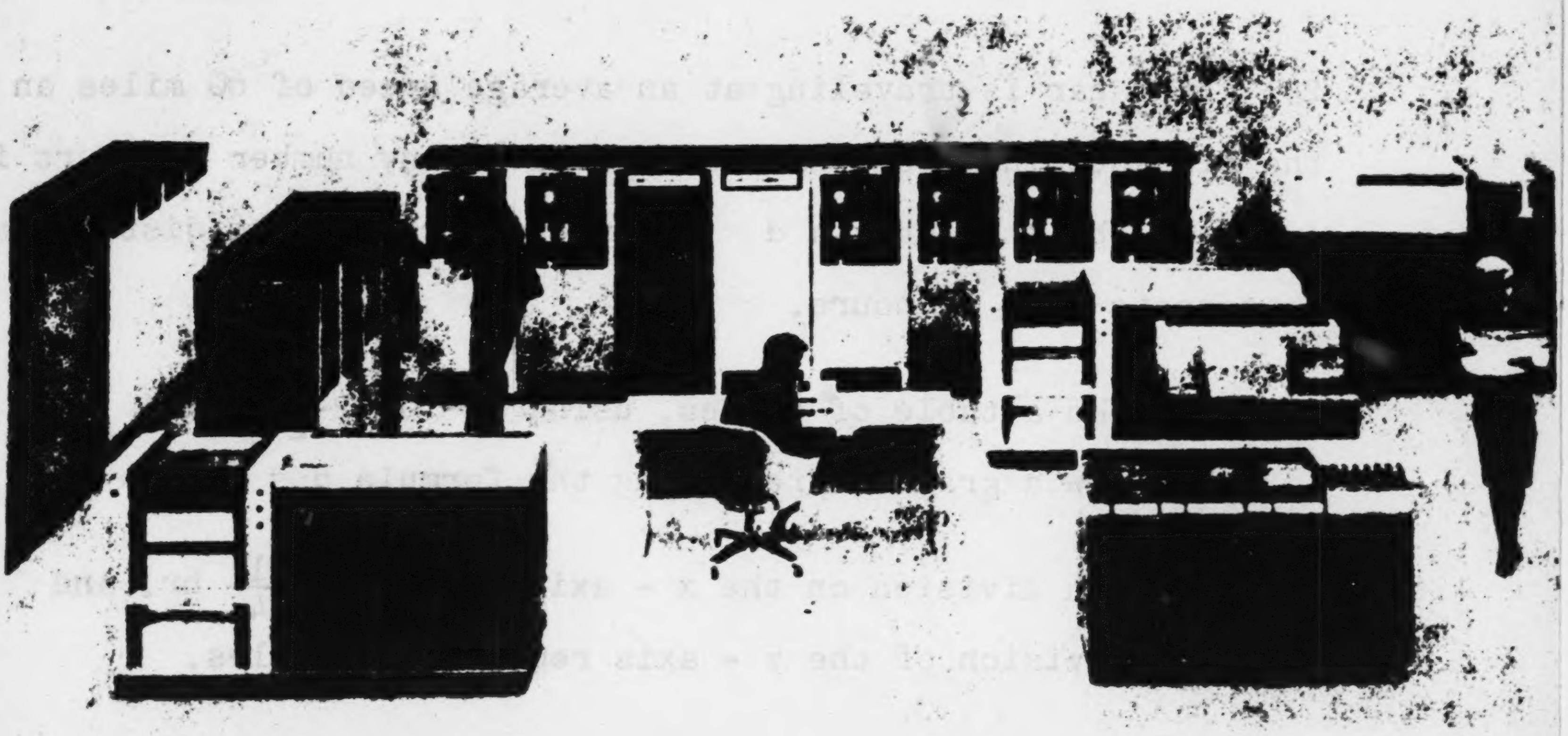
30) 120 mi. 2 31) 40 mi. $\frac{2}{3}$

32) 50 mi. $\frac{5}{6}$ 33) 80 mi. $\frac{3}{4}$

DATA PROCESSING

UNIT VII

- *Computer system.*



Data-processing means putting information into usable form. The machine at the heart of the process is the Computer. The circular parts are tapes for storing information. The girl is carrying an armful of facts put together as Output from the Computer.

Little can be seen when a Computer is working. Most of the action is in the movement of the tapes, the cards going into the machine, or the typewriter printing the paper which comes out of the Computer.

Computers are located in large companies where the volume of scientific problems, business or industrial work, is large.

Using Abbreviations

Just as in Algebra, single letters are used to stand for numbers, so in Data-Processing abbreviations are used to stand for numbers.

After solving the following problems, write the answers with your own 3-letter abbreviations. For example:

Paycheck = 500 + 200 - 310
PYK = 390

Sometimes the first three letters are used. Thus. Paycheck would be PAY.
Othertimes, letters a selected which sugge the word, as CHK for Check.

1) Bill = 1782 + 8123 + 415 + 926
BLL = 11246

2) Credit = 8.25 + 10.50 - 5.45
CRD = 13.30

3) Inventory = 16 + 17 + 13 + 21 + 65 - 13
INV = 119

4) Number = 68 + 31 + 92 + 45 + 16
NUM = 252

5) Score = 13 + 7 + 19 + 5 - 6 - 10 - 2 - 5
SCO = 21

6) Result = (28 x 42) + (29 x 81)
RES = 3525

7) Volume = 3.1412 x 15 x 15 x 6
VOL = 5590.62

8) Net Price = $18735.00 - $13921.00
NPR = # 4814.00

DATA-PROCESSING

Data-Processing has to do with putting a large amount of information into a small, usable form. Even abbreviations are made compact.

Make a guess as to what these abbreviations mean.

Teacher can play a matching game by writing the full word on the board

1)	**OUTPT**	Output
2)	**INPT**	Input
3)	**CHK**	Check
4)	**DAT-PRO**	Data-Processing
5)	**EMP**	Employee
6)	**OVTIM**	Overtime
7)	**FEDTX**	Federal Tax
8)	**BLUCRS**	Blue Cross
9)	**TOTDED**	Total Deductions
10)	**STATX**	State Tax

Think of ten objects such as desk, school, building, and telephone. Write down the ten words and invent your own abbreviations. For example: School - SCH

COLLECTING DATA

Often when you hear someone say, "there is a lot of work to do", it means he is involved in going over a lot of material used in his job. There are many jobs Computers can do where there is a great volume of number facts, and the handling of such facts is repetitious and tedious.

Note the following health records on High School students.

NAME	NUMBER	HEIGHT	WEIGHT	GRADE	DATE
C. Jones	1238	61	100	9	110669
M. Hayfield	4716	64	125	10	110669
A. Fisher	2091	68	119	9	072368
N. Brown	1234	60	117	11	082068
T. Thomas	4681	59	200	12	022369
S. Sant	4225	69	183	11	042468
L. Joy	6117	70	191	10	071668
A. Arles	8000	71	134	9	022369

Write each line of information above on a single card. The 3" x 5" cards, generally used in filing, are ideal for this purpose. Do the following jobs with the cards: (The sorting here is being done by hand. Machines do this with great speed and accuracy.)

1) Sort alphabetically. Sort numerically by number.
2) Find the average height in inches. 65"
3) Find the average weight. 131 lbs
4) How many are in 9th grade? 10th? 11th? 12? 3, 2, 2, 1
5) Sort the cards in order of dates of physicals, from oldest to latest.

Ditto available

HANDLING DATA

Sorting and classifying data is important in modern business and industry. Computers can do there jobs involving hundreds of numbers. Try sorting the following problems into an order from the smallest to the largest.

A 1) 1, 5, 7, 2, 11, 3, 4, 8, 9, 13

2) 10, 20, 14, 21, 19, 36, 41, 18, 24, 16

3) 1.2, 3.5, 3.4, 7.1, 3.6, 1.1, 3.6, 7.0, 5.3, 3.5

4) .11, .17, .13, .14, .10, .21, .19, .22, .23, .12

.10, .11, .12, .13, .14, .17, .19, .21, .22, .23

5) $\frac{1}{2}, \frac{2}{3}, \frac{1}{4}, \frac{1}{5}, \frac{3}{4}, \frac{1}{3}, \frac{3}{8}$

$\frac{1}{5}, \frac{1}{4}, \frac{1}{3}, \frac{3}{8}, \frac{1}{2}, \frac{2}{3}, \frac{3}{4}$

B 6) AB, BC, CD, EA, AA, BA, CA, BD, EC,

AA, AB, BA, BC, BD, CA, CD, EA, EC

7) B1, C3, A4, B5, A3, C2, B2, A1

A1 A3 A4, B1, B2 B5 C2, C3

8) .03, .09, .11, .12, .06, .41, .40, .25

.03, .06, .09, .11, .12, .25, .40, .41

9) These dates: 021469; 091168; 032369

091168, 021469, 032369

10) B12C, A13B, B12A, A12B, B13C

A12B, A13B, B12B, B12C, B13C

WORKING WITH NUMBERS

A Many times it is convenient to use certain words and diagrams in doing math problems.

A set of numbers might be written as:

{ 7, 10, 15, 16, 20 }

And each of the set is called an element. Do the following problems using the above set of elements.

1) Find the sum of all the elements. 68

2) Find the result of multiplying all the elements. 336,000

3) Select the elements which are greater than 7, and less than 20. Write these as a set of numbers. This problem might be written: $7 < x < 20$, where x is an element of the set.

{10, 15, 16}

4) List the odd numbers. List the even numbers. Add each of these sets and find the sum.

{7, 15} 22

{10, 16, 20} + 46

68

5) Square each element and write the square as an element in a new set.

{49, 100, 225, 256, 400}

Ditto
Available

Can You Do These Problems?

1) Add: 1309.62, 403.71, 5000.29, 618.93 7332.55

2) Add the squares of the numbers in the set {2,4,6,8,10}. 220

3) These are the grades of five students. Find the average of each student's grades.

Jones	80	75	85	92	83
Smith	60	70	80	70	70
Johnson	90	95	100	91	94
White	80	87	85	80	83
Ross	90	85	87	90	88

4) Multiply each element of the set {2,4,6,8,10} by the corresponding element of set {5,10,15,20,25} and show the result as a set of new elements. {10,40,90,160,250}

5) Select the numbers between 15 and 20 from this set of numbers and add them.

3	6	16	18	20
17	12	10	7	19
9	6	5	18	7
15	10	18	16	20
19	13	3	17	17

175

300

CODING INFORMATION

Coding means letting numbers, or letters, or both together, stand for facts. A large Department Store might code price-tags. for its shoes in this way.

M, or W, = Men's Shoes, Women's Shoes
6 - 14, = Sizes
BL, WH, TN, BR, RD, = Colors
032169, = month, day, year
$14.50, = price of shoes

A tag on a pair of shoes might look like this:

M10BL012369

$9.95

When the shoes are sold, the code could be copied on the Sales Slip. All this information, or data, is available.

Men's shoes, Size 10, Black color, Sales Price of $9.95, attached Jan. 23, 1969

WHAT DO YOU ALREADY KNOW?

Students can use a dictionary.

1) What do you think "Data" means?

2) How can you "process" data?

3) What is a Computer?

4) Can you say how Data-Processing may affect your life?

5) Teachers are involved with Data-Processing. All over the city, school teachers mark grades of students on cards. These cards are sent to a central Computer. In no time at all, the Computer produces Report Cards for the students.

   Describe what you think might be good in this system.

6) The Electric Power and Light Co. sends bills to each of its thousands of customers each month. How does the company get information for charging its customers? What information is sent to the customer on the bill?

7) The Telephone Co. sends bills to customers. Each bill is really a card from a Computer. What information would a customer want to have in addition to the amount due?

8) Perhaps you have been paid by a check from a Computer. List the things you might learn by carefully examining a pay-check.

9) How far away from this school do you think the nearest Computer equipment is located?

Diff.
[illegible]

CODING

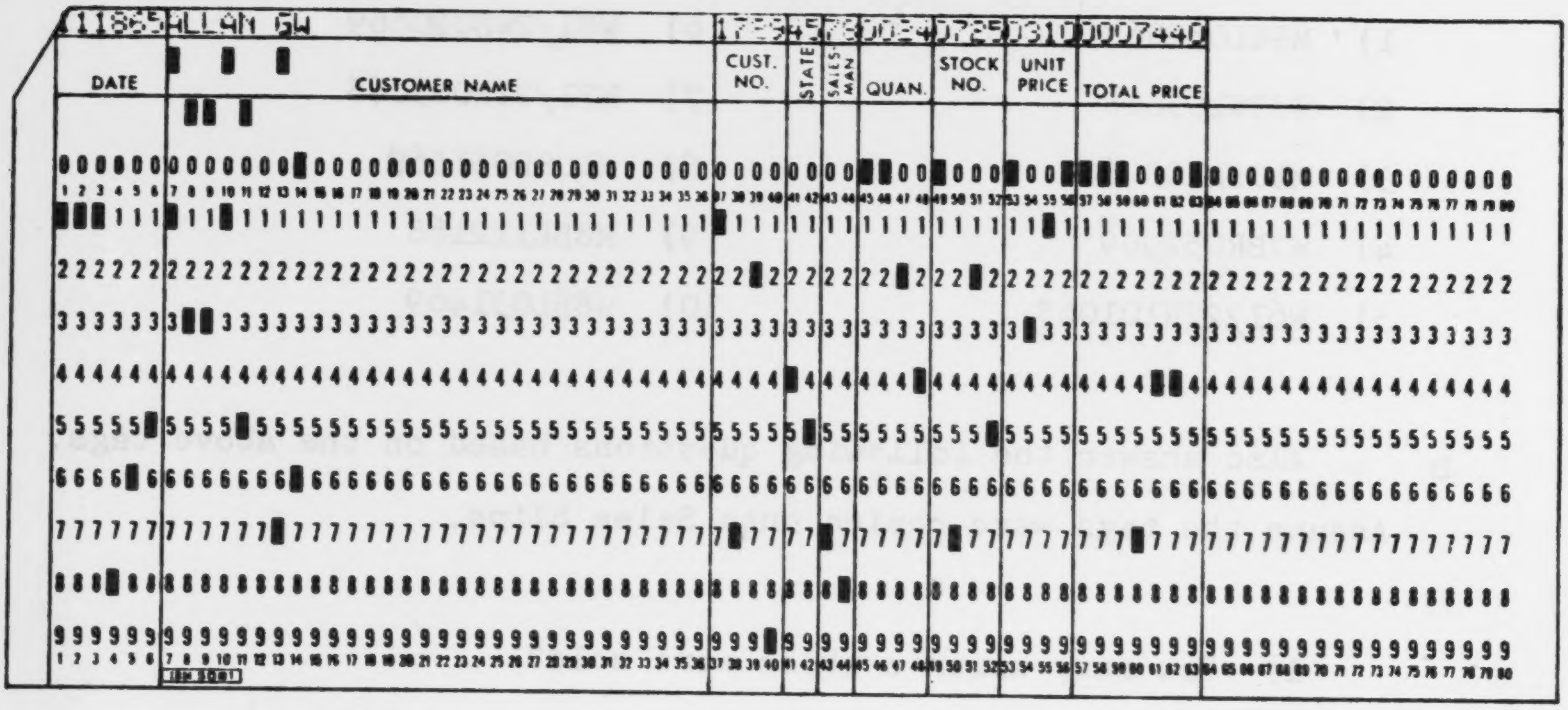
A Study the following tags from shoes, and write a description of the shoes based on the previous Code.

1) M9BL052068 Men's, size 9, Black, May 20, 1968
2) W7TN103068
3) M10BR103068
4) W7BR052069
5) W61/2TN101068
6) W81/2WH020669
7) W71/2TN063068
8) M10RD051568
9) M8BL112168
10) W8BL031469

B Also answer the following questions based on the above tags. Assume the tags were copied onto Sales Slips.

1) How many women's shoes were sold? 6
2) How many men's shoes, size ten, were sold? 2
3) How many black shoes were sold? 3
4) What tag has been on the shoes the longest time? May 15, 1968
5) Which tag is the newest? May 20, 1969
6) How many tags were placed on shoes before June 30, 1968? 2
7) How many tan shoes were sold? 3
8) In what year were most tags put on shoes? 1968
9) How many tags were attached after October 10, 1968? 6
10) How many tags indicate sizes larger than size 9? 2

A Computer cannot read odd-shaped tags and Sales Slips. Such information has to be punched on cards of special size. The Computer can read such a card as this:


111865ALLAN GW
17734578002407250310000007440
DATE
CUSTOMER NAME
CUST. NO.
STATE
SALES MAN
QUAN.
STOCK NO.
UNIT PRICE
TOTAL PRICE

With such cards placed in the Computer it is possible to sort hundreds of such cards. Names can be put in alphabetical order; customer's numbers can be put in numerical order; all cards of a certain date, or item, can be selected. The Computer can add the charges of a hundred customers with lightning speed.

Using 3" x 5" cards, try designing some Computer cards. Make up information such as appears in the sample above. Try sorting your cards in different ways.

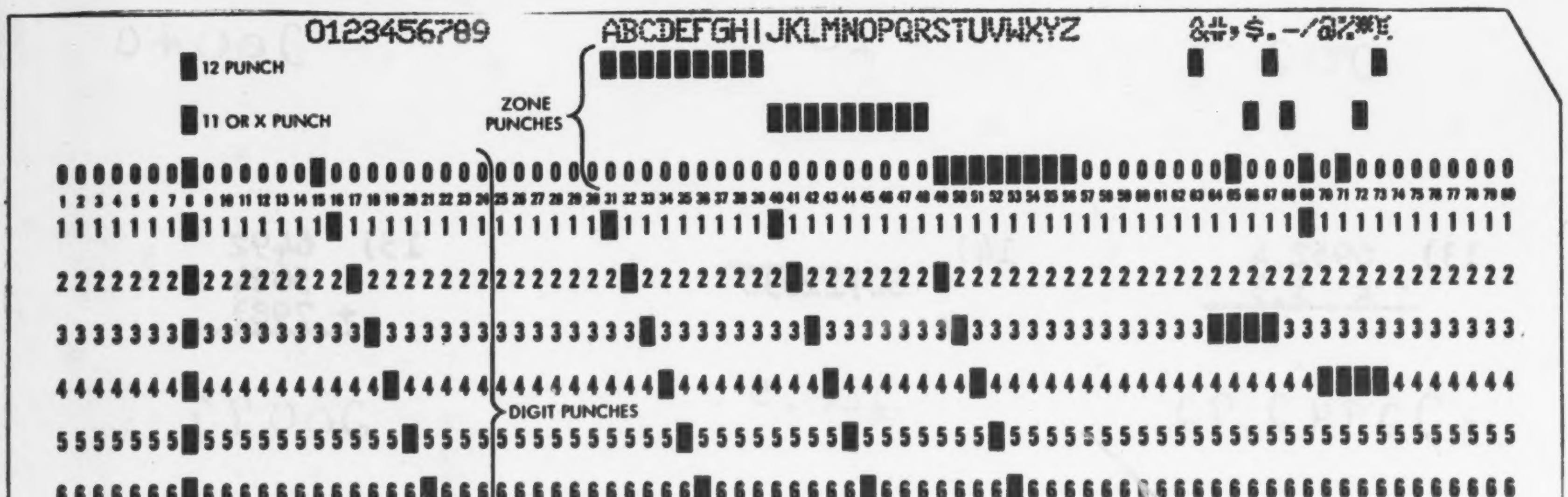
ditto available

Punching IBM Cards

The teacher may wish to follow up a study of the card on the previous page with a more careful look at how letters and numbers are punched.

The card has 80 columns across its face, and these are numbered from left to right. There are ten rows on the card from top to bottom. The first row is zero; the bottom row is nine. Numbers are easy to read because a hole is punched right on the number row.

Letters are punched with two holes. Letters A to I are punched with one hole in the "12 punch" row and one hole in a number hole. J to R letters have one hole in the "11 punch" and one hole in the number row. S to Z has one hole in the 10, or zero, row and one in a number row.


0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ
&#,$.-/@%*⌑
12 PUNCH
11 OR X PUNCH
ZONE PUNCHES
DIGIT PUNCHES

ditto
available

Practice

1) 292
356
429
+ 584
1661

2) 403.25
941.62
+ 293.21
1638.08

3) 543491
- 298430
245061

4) 43852
64390
+ 76431
184673

5) 443
x 16
7088

6) 56432
- 32874
23558

7) 98.5642
x .31
3055.4902

8) 65298
- 32980
32318

9) 643.50
x 4.2
2702.7

10) 32) 6464
202

11) 52)1040
20

12) 3.2)64128
20040

13) 6952.4
x 3.3
22942.92

14) 60)12030
200.5

15) 6492
5624
+ 7983
20099

ditto
available

Drill

1) 10% as a decimal = ? .10

2) 50% of 200 = ? 100

3) 1.6 is what fraction ? $1\frac{3}{5}$

4) 5% of 50 = ? 2.5

5) 50% as a decimal = ? .50

6) 29% as a decimal = ? .29

7) 15% of 300 = % 45

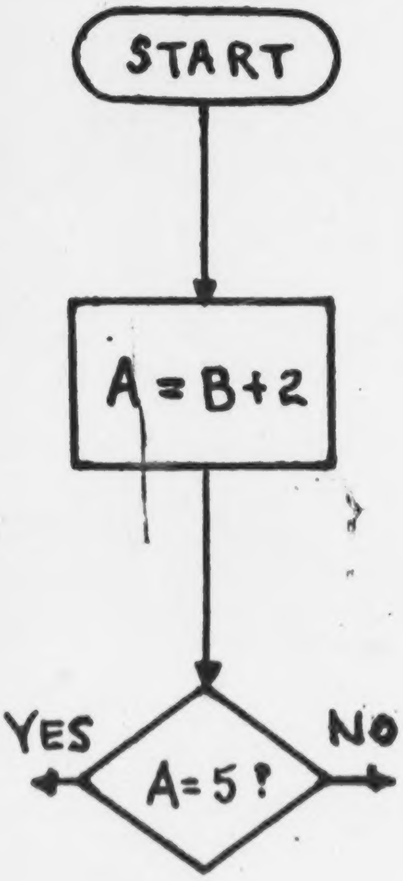
8) 6.5% as a decimal = ? .065

9) 3% of 39 = ? 1.17

10) 25% is what fraction ? $\frac{1}{4}$

FLOW-CHARTING

Flow-Charting is simply a way of showing the steps in doing some problem. Certain symbols have come to mean certain things in Flow-Charting.



A oval can indicate a starting, or stopping place.

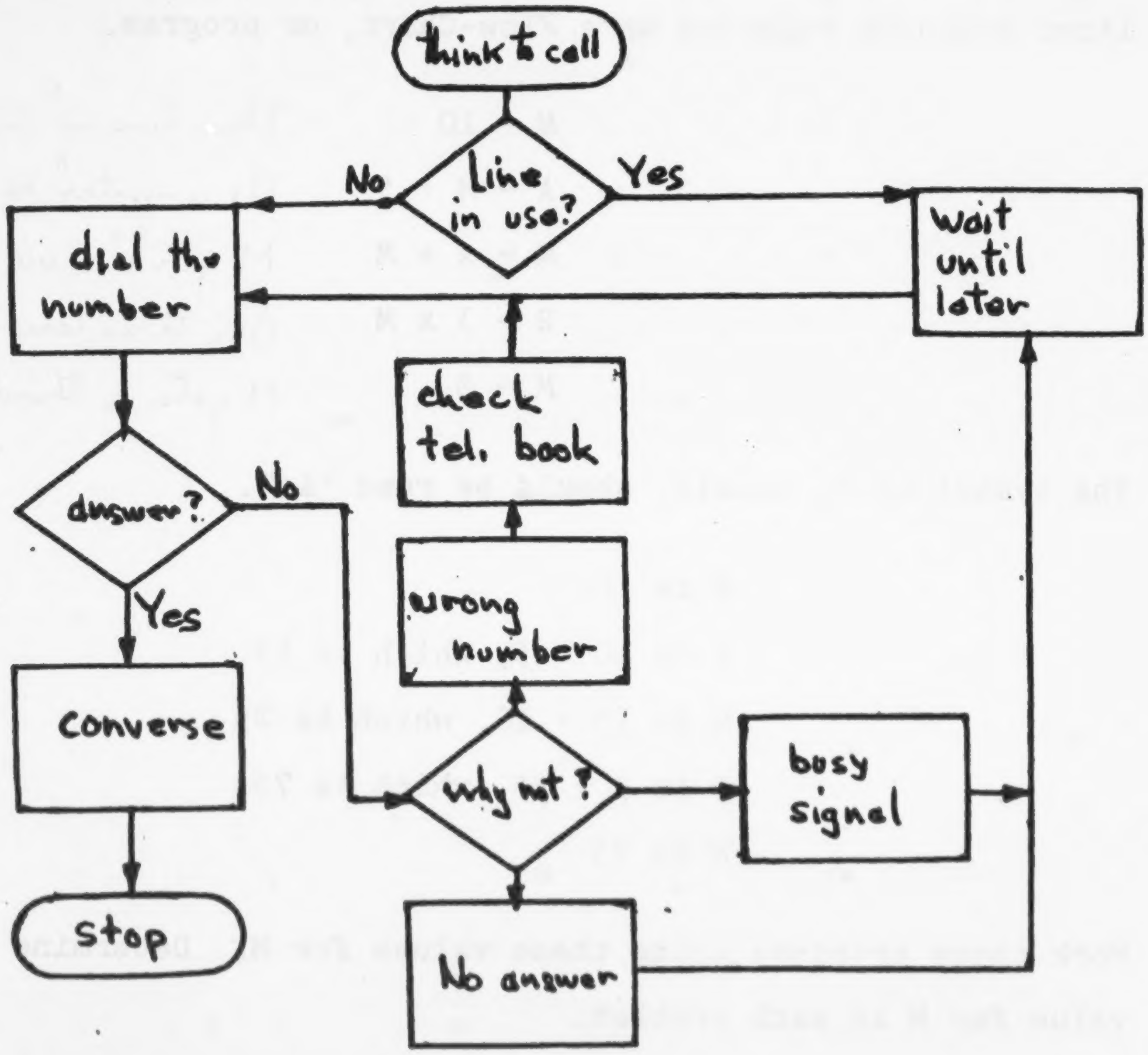
A rectangle indicates an operation. The way to read this is, "add 2 to whatever number B stands for, and let this result equal A.

A diamond indicates a decision. The points may indicate "Yes," or "No".

Arrows indicate the flow of ideas through the Flow-Chart.

FLOW-CHARTING A TELEPHONE CALL

Flow-Charts can be used to show the flow of ideas, as well as to trace mathematical operations. Here are the stages and decisions involved in making a telephone call.


think to call
Line in use?
No
Yes
dial the number
wait until later
check tel. book
answer?
No
Yes
wrong number
Converse
why not?
busy signal
Stop
No answer

Try Flow-Charting some other thing such as: putting on a sweater, tying your shoes, catching a bus, making a sandwich, getting a book at the library.

A KEY IDEA IN PROGRAMMING

In Flow-Charting, programming and Computer Operation, the value of a variable may change during the process of solving a problem. Notice in the following lines that "M" changes the value. The following lines could be regarded as a Flow-Chart, or program.

M = 10 This line is "input"

A = M + 5 The computer "remembers" that M=10

M = A + M M gets a new value!

B = 3 x M B is three times this new value

M = B M gets a third value.

The symbol of =, equals, should be read "is".

M is 10

A is 10 + 5, which is 15

M is 15 + 10, which is 25

B is 3 x 25, which is 75

M is 75

Work these problems using these values for M. Determine the final value for M in each problem.

1) M = 100
2) M = 123.4
3) M = 0.182
4) M = $\frac{1}{2}$
5) M = $68245

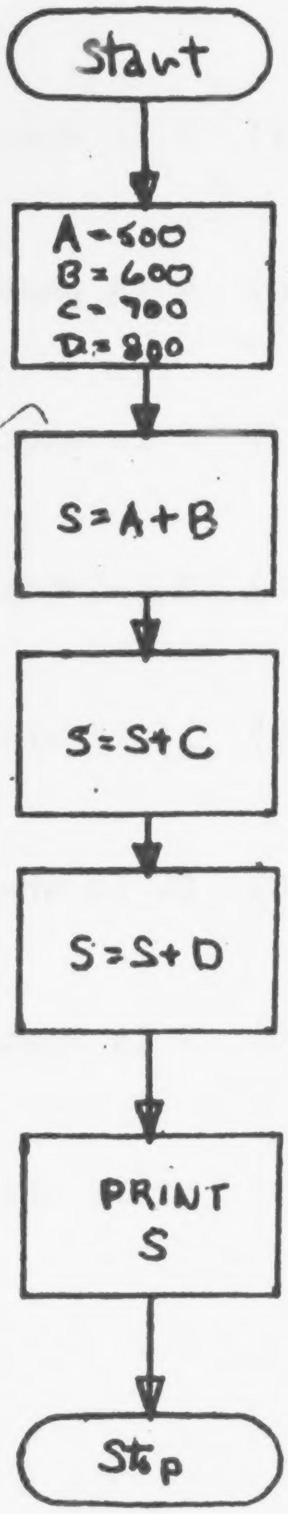
These problems provide "input" information for the "program" above.

To make a Flow-Chart showing how a math problem is done is different. To be able to make a workable Flow-Chart is to be a Programmer. The Programmer is the real brains running the Computer. There is only a step between writing a Flow-Chart and actually solving problems on a Computer.

Here is a simple problem in addition. Add 4 numbers: 500, 600, 700, and 800. Name the numbers with letters. A = 500, B = 600, C = 700, D = 800. Let S be the sum which you want.

The first rectangle is "input". The Computer is told what the numbers are.

The second rectangle is addition of the first two numbers. The third rectangle uses this sum to add to C, the third number, This "process" is repeated until the final sum is arrived at, and printed.



Input

The computer, "programmed" like this, will add any numbers.

ditto
available

Practice With Percent

1) 4 is what percent of 100 ? 4%

2) 10 is what percent of 50 ? 20%

3) 5 is what percent of 25 ? 20%

4) 4 is what percent of 16 ? 20%

5) 6 is what percent of 12 ? 50%

6) 2 is what percent of 10 ? 20%

7) 15 is what percent of 60 ? 25%

8) 24 is what percent of 96 ? 25%

9) 7 is what percent of 28 ? 25%

10) 12 is what percent of 24 ? 50%

A VARIETY OF PROBLEMS

Here are some problems which can be run through the Flow-Chart very much like solving problems in a real Computer. The first problem is given as an example:

1) **Add:** 1000, 2000, 3000, 5000. **let** $A = 1000$, $B = 2000$, $C = 3000$, $D = 5000$. **Follow the Flow-Chart outline as a guide, or else draw a new one and write the numbers in each rectangle as you go through.**

$S = A + B$, $S = 1000 + 2000$, $S = 3000$

$S = S + C$, $S = 3000 + 3000$, $S = 6000$

$S = S + D$, $S = 6000 + 5000$, $S = 11000$

Print $S = 11000$

2) **Add:** 187, 432, 113, 781 1513

3) **Add:** $\frac{1}{2}$, $\frac{3}{4}$, $\frac{1}{3}$, $1\frac{1}{2}$ $3\frac{1}{12}$

4) **Add:** 1.35, 2.37, 4.80, 6.23 14.75

5) **Add:** 0.008, 0.062, 0.113, 0.703 .886

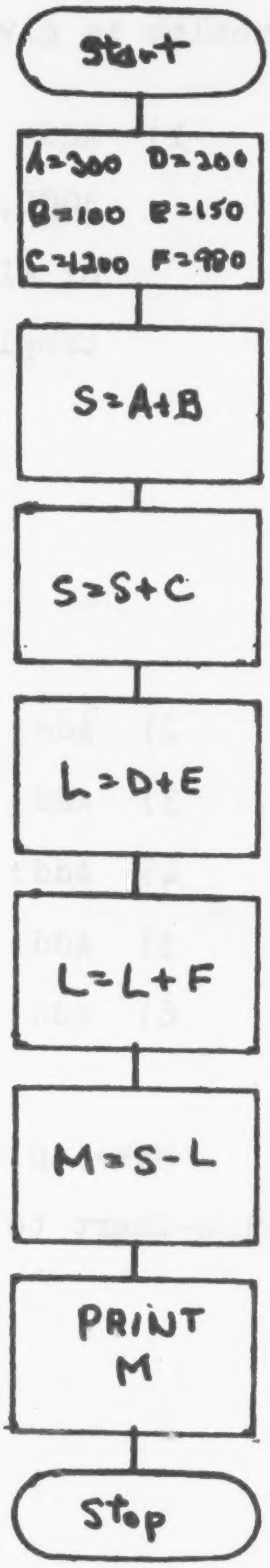
6) **Add:** 11856, 2340, 4400, 55120

73716

Make up some problems for yourself. If necessary, change the Flow-Chart to include more, or fewer numbers.

Each problem demands a different Flow-Chart. Suppose your problem required you to add two different sets of numbers, subtracting the second sum from the first sum? Here is the problem:

Add 300, 100, 1200, and subtract the sum of 200, 150, and 980.



Solution. Let A = 300, B = 100, C = 1200, D = 200, E = 150, and F = 980.

The first and second numbers are added.

This sum is added to the third number.

Another letter, L is the sum of the 4th and 5th numbers.

This sum is added to the last number.

The second sum is subtracted from the first.

The desired result is printed out.

Note how easy it is to think of a Class being a Computer, each student handling one operation.

ditto available

A 1) 653
281
465
218
1617

2) 605.31
402.05
+ 613.07
1620.43

3) 419607
- 321841
97766

4) 618
x 21
12978

5) 3.15
x 3.1
9.765

6) 1.0035
x 21
21.0735

7) 21) 4242
20.2

8) 487) 243.5
.5

9) 2.8) 6.972
.249

B 10) 12% is what decimal fraction? .12
11) 40% as a decimal = ? .40
12) 8.8% as a decimal = ? .088
13) .04 is what fraction? $\frac{1}{25}$
14) 1.50 is what fraction? $1\frac{1}{2}$

15) 20% of 800 = ? 160
16) 150% of 500 = ? 750
17) 2% of $100.00 = ? 2
18) 3.5% of 180 = ? 6.3
19) 2% of 36 = ? .72

C 20) 25 is what percent of 100 ? 25%
21) 20 is what percent of 100 ? 20%
22) 15 is what percent of 90 ? $16\frac{2}{3}$%

23) 10 is what percent of 80? 12.5%
24) 7 is what percent of 35? 20%
25) 9 is what percent of 27? $33\frac{1}{3}$%

Try making a Flow-Chart for solving each of the following problems. After a Flow-Chart is made it is necessary to run the problem through it, just as if it were a Computer, to see if it works.

Answers to these first four problems are on the next pages.

1) Add: 40, 62, 35, and subtract 77.

2) Multiply: 80, 65, 34, and add 1000.

3) Add: 10% of 60 to 25% of 80.

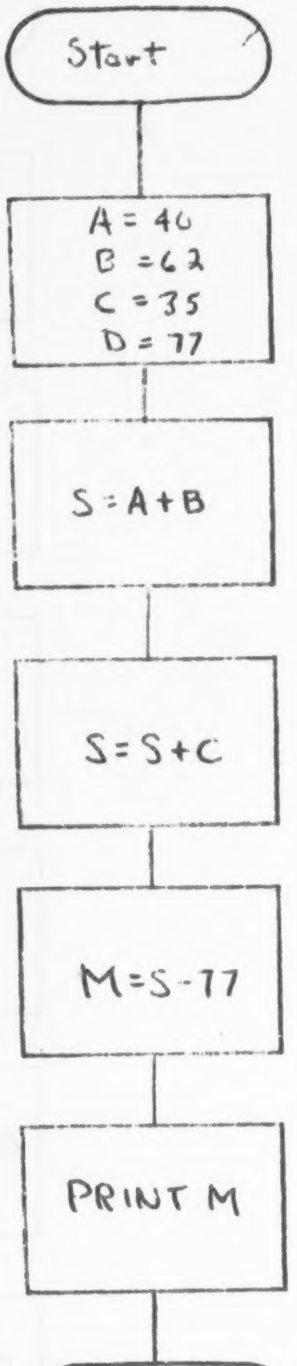
4) Find $\frac{1}{2}$ of 350, $\frac{1}{4}$ of 1200, $\frac{2}{3}$ of 2700, and add the results.

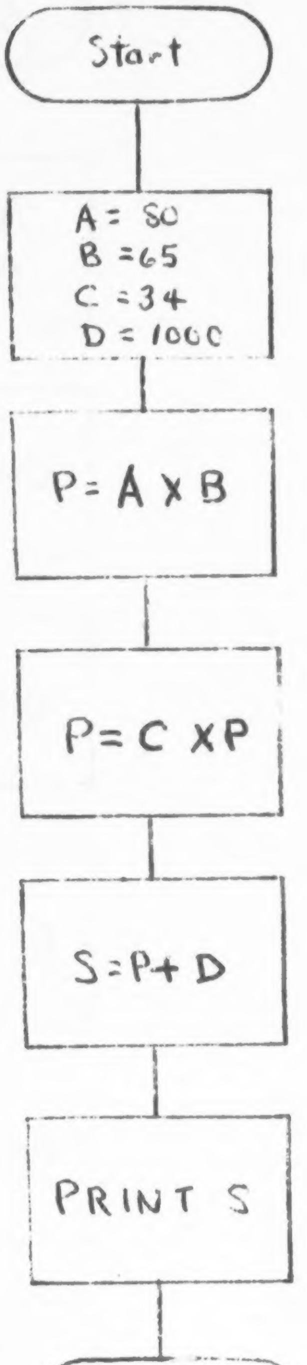
5) Find the Average of the following grades: 75, 85, 80, 95, 80.

83

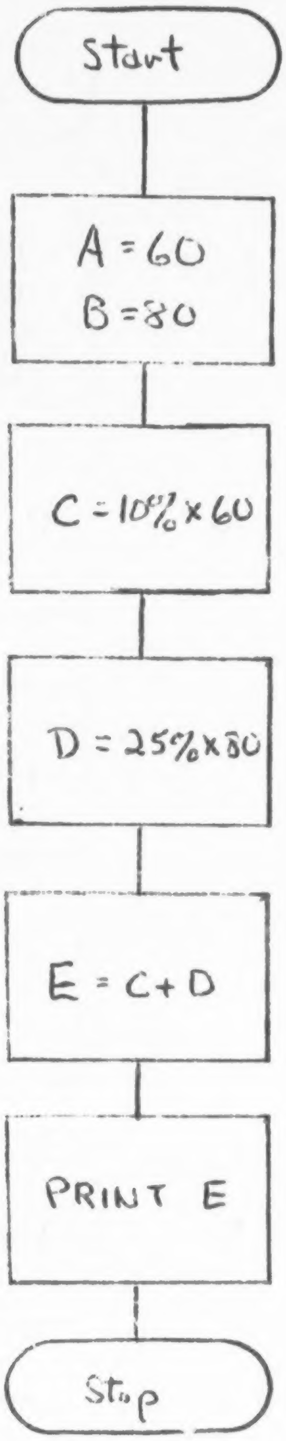
6) Add the elements of set A = { 1.3, 2.4, 4.8}, and subtract the sum of the elements in set B = { o.5, 1.9, 3.5}

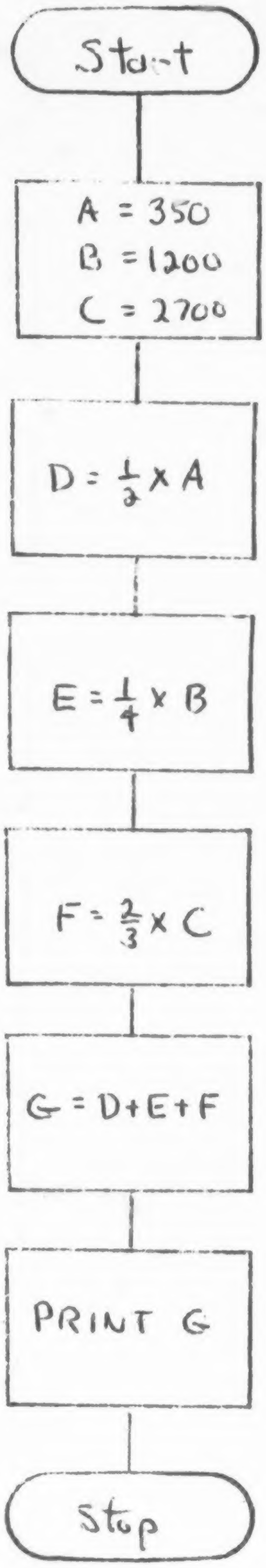
2.6


Start
A = 40
B = 62
C = 35
D = 77
S = A + B
S = S + C
M = S - 77
PRINT M
Stop


Start
A = 80
B = 65
C = 34
D = 1000
P = A X B
P = C X P
S = P + D
PRINT S
Stop

315 T1

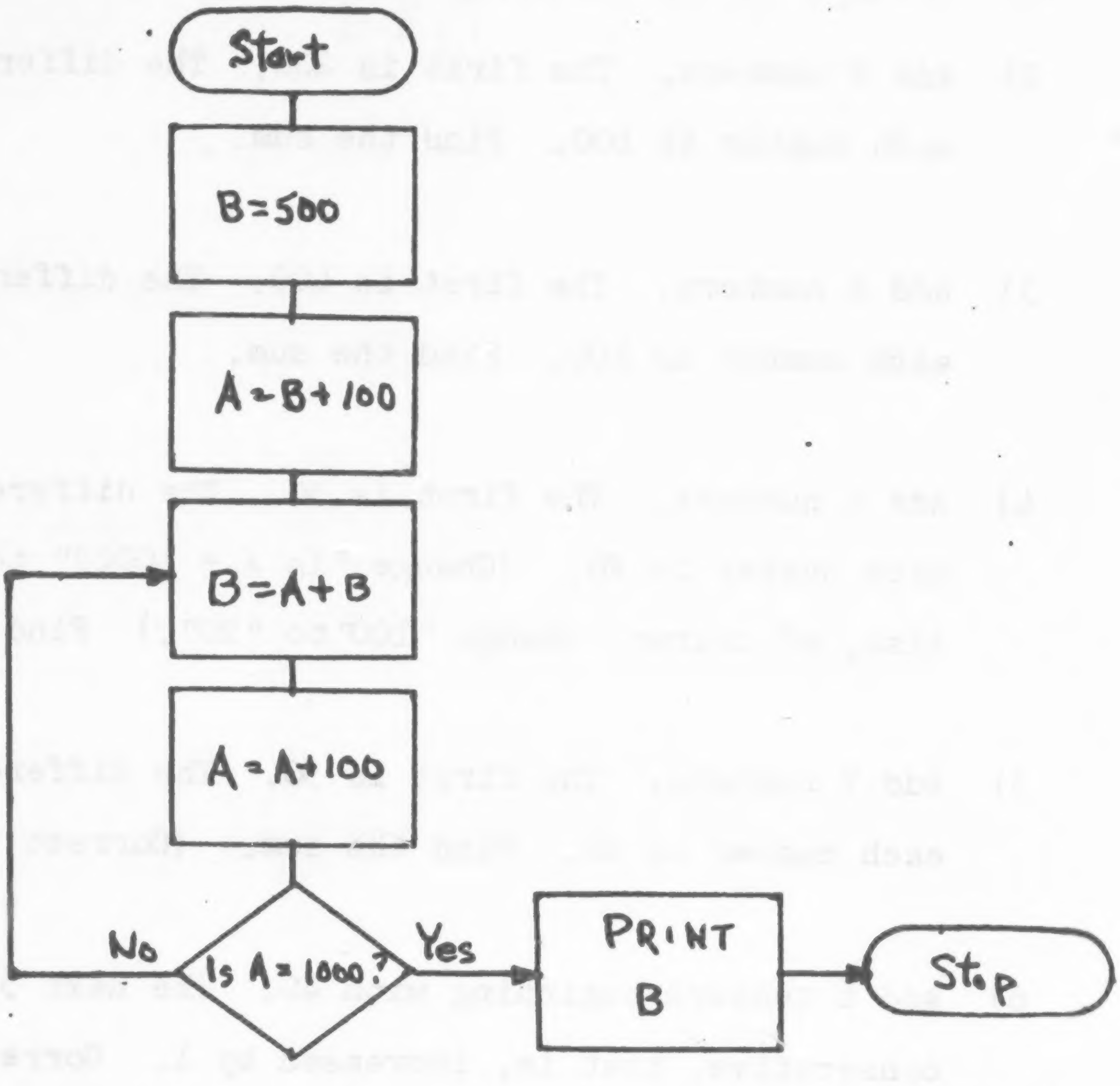

Start
A = 60
B = 80
C = 10% x 60
D = 25% x 80
E = C + D
PRINT E
Stop


Start
A = 350
B = 1200
C = 2700
D = $\frac{1}{2}$ x A
E = $\frac{1}{4}$ x B
F = $\frac{2}{3}$ x C
G = D + E + F
PRINT G
Stop

315 T 2

Some Flow-Charts, just as the actual Computers, involve other features. For example, here is a problem, and the Flow-Chart with which to solve it.

"Add 5 numbers. The first is 500, and the difference between each number is 100. Find the sum".


Start
B=500
A=B+100
B=A+B
A=A+100
Is A=1000?
No
Yes
PRINT B
Stop

The above problem would be "solved" like this. B = 500, A = 600, B = 1100, A = 700, is A = 1000? No, B = 1800, A = 800, is A = 1000? No, B = 2600, A = 900, is A = 1000 ? No, B = 3500, A = 1000, is A = 1000? Yes, print B = 3500.

Can you find what is call a "LOOP" and a "DECISION" in the Flow-Chart?

Refer to the Flow-Chart on the previous page. But notice that some changes must be made in order to do the following problems.

1) Add 3 numbers. The first is 700. The difference between the numbers is 100. Find the sum. This problem is done for the Teacher on the following page.

2) Add 8 numbers. The first is 200. The difference between each number is 100. Find the sum.

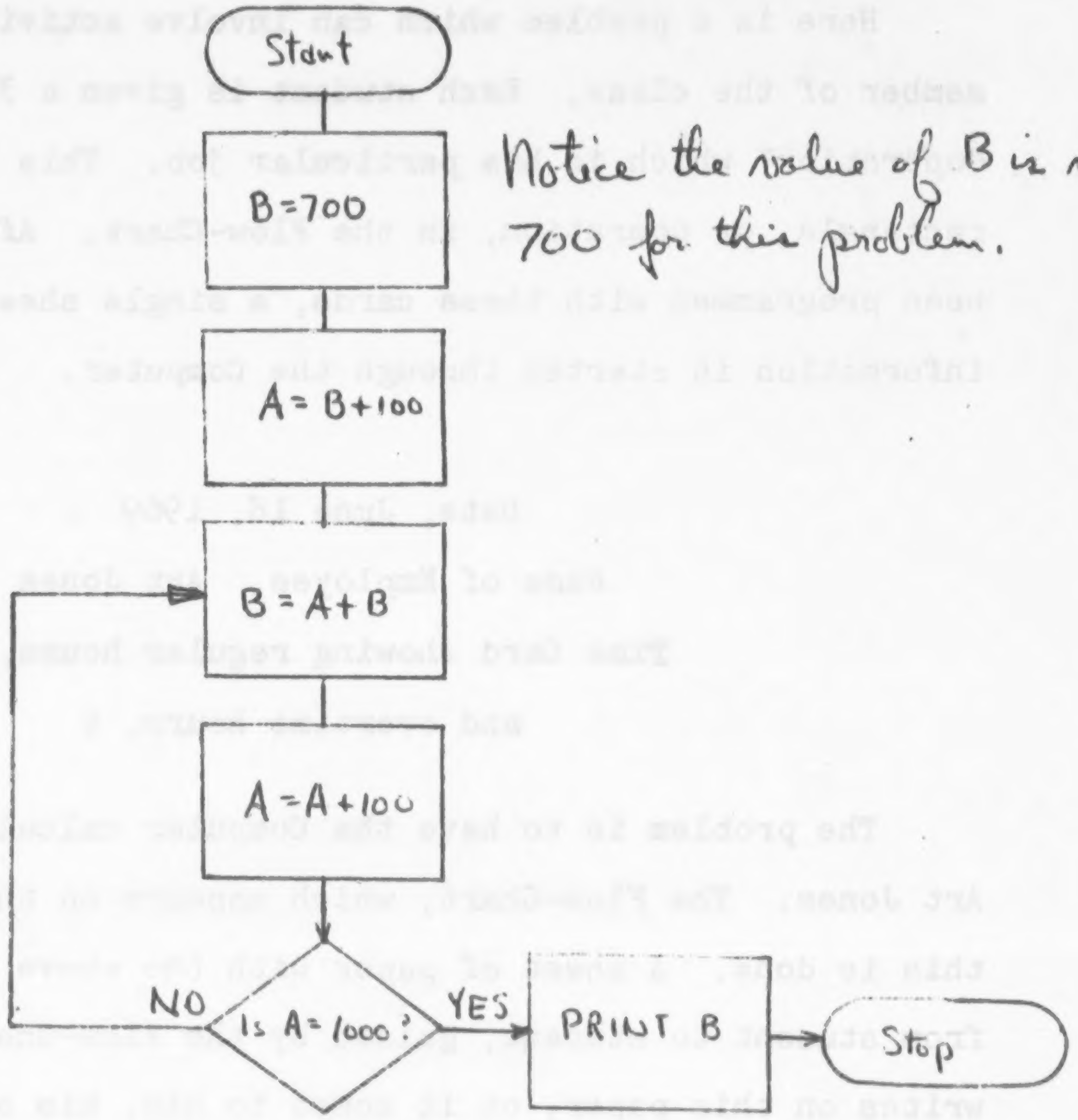
3) Add 6 numbers. The first is 400. The difference between each number is 100. Find the sum.

4) Add 4 numbers. The first is 50. The difference between each number is 20. (Change "Is A = 1000?" to "Is A = 130?" Also, of course, change "100" to "20".) Find the sum.

5) Add 7 numbers. The first is 50. The difference between each number is 20. Find the sum. (Correct the Flow-Chart)

6) Add 6 numbers beginning with 40. The next 5 numbers are consecutive, that is, increased by 1. Correct the Flow-Chart, and find the sum.

Problem 1)


Start
B=700
A=B+100
B=A+B
A=A+100
NO
Is A=1000?
YES
PRINT B
Stop

Notice the value of B is made 700 for this problem.

Here is how the variables change as they cycle around.

B = 700

A = 700 + 100 = 800

B = 800 + 700 = 1500

A = 800 + 100 = 900

Is A = 1000?

NO

B = 900 + 1500 = 2400

A = 900 + 100 = 1000

Is A = 1000?

YES

PRINT B = 2400

Check:

$$\begin{array}{r} 700 \\ 800 \\ +\ 900 \\ \hline 2400 \end{array}$$

Here is a problem which can involve activity on the part of every member of the class. Each student is given a 3" x 5" card with the "operation" which is his particular job. This card corresponds to a rectangle, or operation, in the Flow-Chart. After the class has been programmed with these cards, a single sheet of paper with this information is started through the Computer.

Date, June 18, 1969

Name of Employee, Art Jones

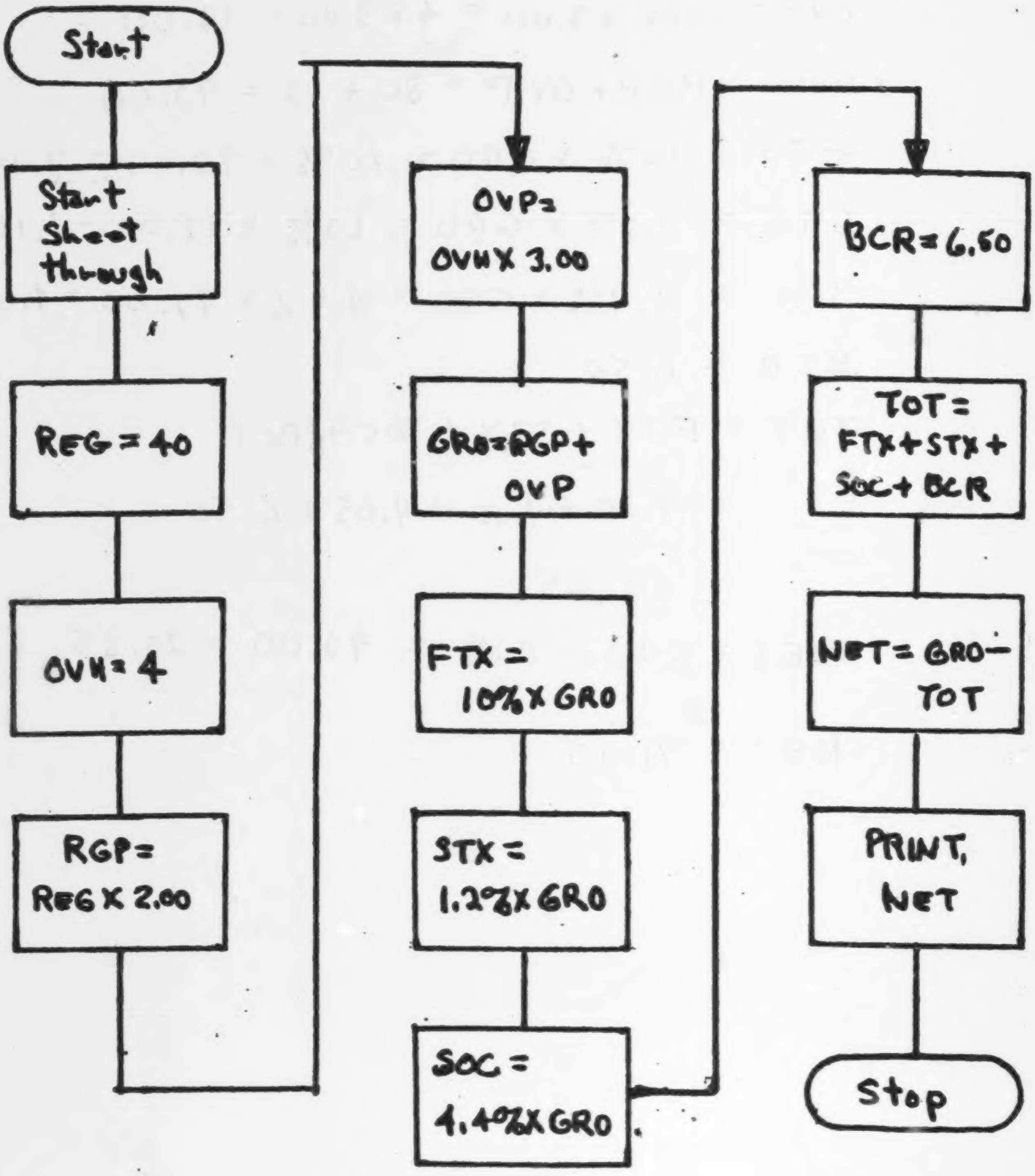
Time Card showing regular hours, 40

and overtime hours, 4

The problem is to have the Computer calculate the Net Pay for Art Jones. The Flow-Chart, which appears on the next page, shows how this is done. A sheet of paper with the above heading is passed from student to student, guided by the Flow-Chart. Each student writes on this paper, on it comes to him, his specific operation. If each student does his math correctly, the sheet will finally come out with the Net Pay amount printed as a last line.

The Computer may remain "programmed", and other "employees" be put through. That is, another sheet of paper bearing different names and hours worked, would be used.

ditto available


Start
Start Sheet through
REG = 40
OVH = 4
RGP = REG X 2.00
OVP = OVH X 3.00
GRO = RGP + OVP
FTX = 10% X GRO
STX = 1.2% X GRO
SOC = 4.4% X GRO
BCR = 6.50
TOT = FTX + STX + SOC + BCR
NET = GRO − TOT
PRINT, NET
Stop

See the following page for explanation and check.

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Final Problem

RGP = REG × 2.00 = 40 × 2.00 = 80.00

OVP = OVM × 3.00 = 4 × 3.00 = 12.00

GRO = RGP + OVP = 80 + 12 = 92.00

FTX = 10% × GRO = 10% × 92.00 = 9.20

STX = 1.2% × GRO = 1.2% × 92.00 = 1.10

SOC = 4.4% × GRO = 4.4% × 92.00 = 4.05

BCR = 6.50

TOT = FTX + STX + SOC + BCR

= 9.20 + 1.10 + 4.05 + 6.50

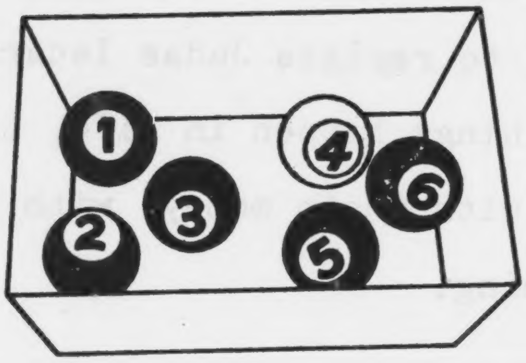
= 20.85

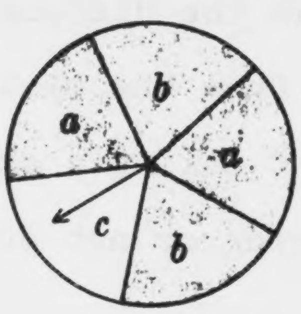
NET = GRO − TOT = 92.00 − 20.85

NET = $71.15

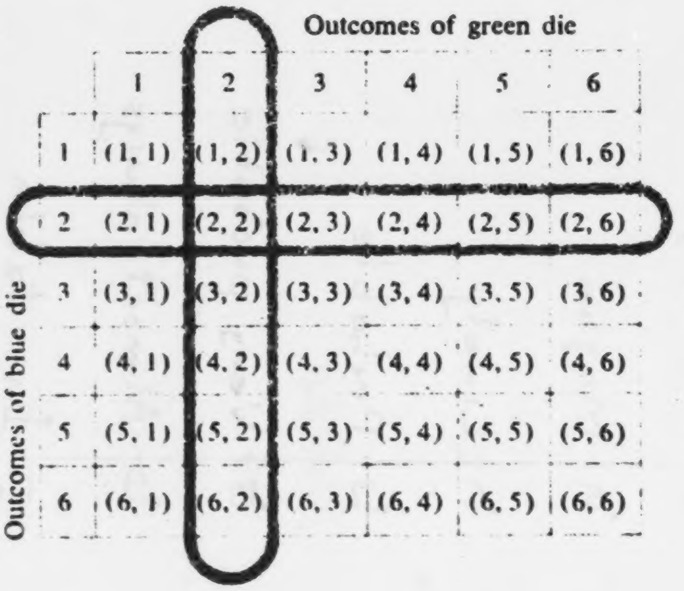
PROBABILITY

UNIT VIII

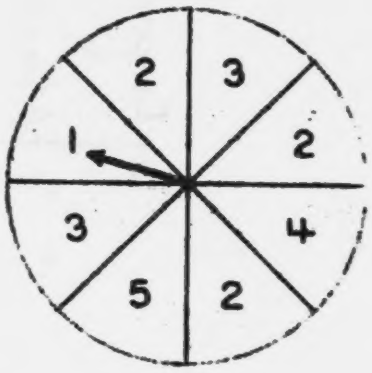




Probability is a subject for modern times. Everyone wonders at times, about the chance of something happening. He may be only tossing a coin or drawing a ball out of a box. As a scientist he could be performing an experiment in which Sample Space is required. As a business man he may be keeping records of facts. Some understanding of Probability is essential for our new world.



	Outcomes of green die					
Outcomes of blue die	1	2	3	4	5	6
1	(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
2	(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
3	(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
4	(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
5	(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
6	(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

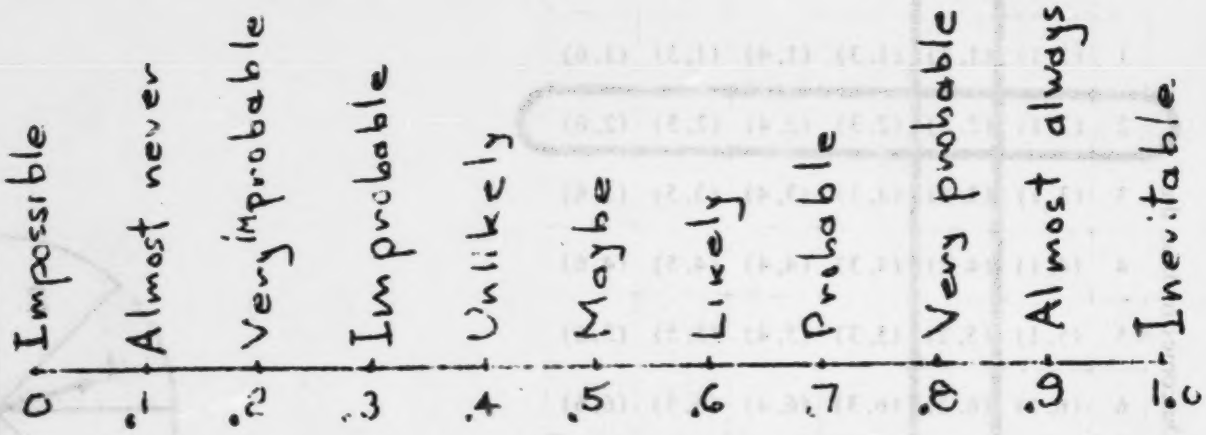


PROBABILITY

This subject has interested mankind from early times. The Bible records the diciples "drawing lots" to replace Judas Iscariot. Apart from the mystery of the way things happen in life, there is the lure of taking a chance with Fate, with one's money, with one's luck, and doing or not doing a certain thing.

We say things like, "What are the odds?", "What are my chances?", "How possible is it?", and "How probable is it?" Generally we are satisfied to say of some event that it happen "often", "not often", "never", or "sometimes."

Let's make a Probability Scale. It will be useful in working the problems on the next page. See if you know the meaning of all the words. Perhaps you can add some words.


0 Impossible
.1 Almost never
.2 Very improbable
.3 Improbable
.4 Unlikely
.5 Maybe
.6 Likely
.7 Probable
.8 Very probable
.9 Almost always
1.0 Inevitable

Look at the many interesting subjects for study.

A Write down the word from the Probability Scale which comes to mind as a guess.

1) Finding a dollar bill ———— a student may answer "almost never"
2) Making a telephone call today
3) Taking a boat ride
4) Going to school today
5) Sharpening a pencil
6) Chatting with your best friend
7) Getting mad
8) Running away from home
9) Not getting paid for your work
10) Getting an A grade in math

B Match these ten situations, in the same order, with the ten items above, but change the probability to suit these specific situations. For example: If you work in a bank, you are "more likely" to find a dollar bill.

1) You work in a bank
2) You are a telephone operator
3) You are camping in a desert
4) The first day of school in September
5) There are 20 students in your classroom
6) School is closed for a holiday
7) Your locker will not always open easily
8) You enjoy being home
9) You have known these people who hire you for a long time
10) You are not taking math this year

Compared to "almost never" a student might now, in a banking situation, answer "unlikely".

ditto
[illegible]

Going From Fractions To Decimals

1) $\frac{1}{10}$ .1

2) $\frac{7}{10}$ .7

3) $\frac{9}{10}$ .9

4) $\frac{1}{2}$ .5

5) $\frac{2}{5}$ .4

6) $\frac{3}{5}$ .6

7) $\frac{3}{4}$ .75

8) $\frac{15}{25}$ .6

9) $\frac{26}{50}$ .52

10) $\frac{9}{36}$ .25

11) $\frac{1}{8}$ .125

12) $\frac{30}{100}$ .3

13) $\frac{4}{50}$ .08

14) $\frac{24}{25}$ .96

15) $\frac{7}{8}$ .875

16) $2\frac{1}{4}$ 2.25

17) $3\frac{3}{8}$ 3.375

18) $\frac{10}{30}$ $.33\frac{1}{3}$

19) $\frac{375}{1000}$ .375

20) $\frac{3}{27}$ $.11\frac{1}{9}$

From Decimals to Percents

The symbol % means $\frac{1}{100}$. Notice how easy it is to go from:

.25 to 25%

$$.25 = \frac{25}{100} = 25 \times \frac{1}{100}$$

Now $\frac{1}{100}$ is %

So why not .25 = 25 % ?

There is an old rule that goes "move the decimal point to the right 2 places, and add the % symbol."

Change the following decimal fractions to percents.

1) .50 50%

2) .72 72%

3) .35 35%

4) .05 5%

5) 1.50 150%

6) $.33\frac{1}{3}$ $33\frac{1}{3}$ %

7) $.01\frac{1}{2}$ $1\frac{1}{2}$ %

8) .155 15.5 %

9) 2.75 275 %

10) .005 .5%

ditto available

Rounding To Tenths Place

If the digit in the hundredths place is 5 or more, increase the digit in the tenths place by one.

1) .25 .3

2) .37 .4

3) .71 .7

4) .90 .9

5) .35 .4

6) .62 .6

7) .46 .5

8) .32 .3

9) .54 .5

10) .85 .9

11) .30 .3

12) 2.51 2.5

13) 3.06 3.1

14) 10.43 10.4

15) .39 .4

16) .99 1.0

17) 1.81 1.8

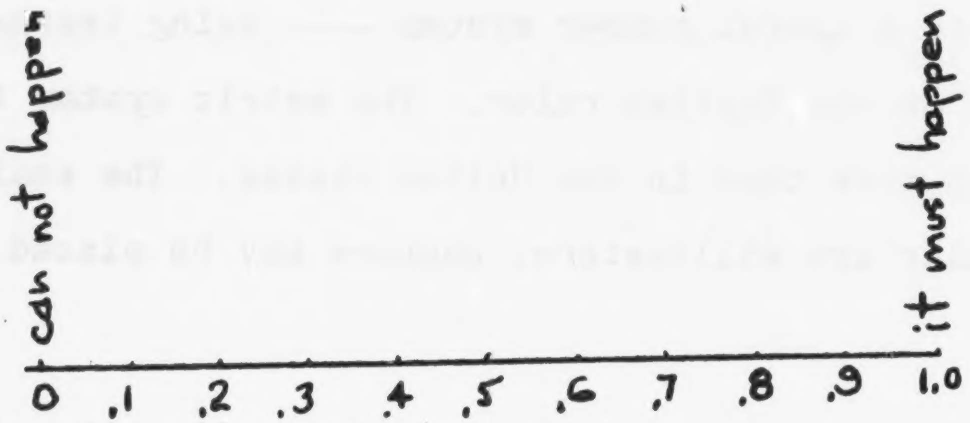
18) 1.99 2.0

19) 9.99 10.0

20) .76 .8

Making A Probability Scale

Mathematical



Put down after each a guess using the above Scale.

1) That the sum rises tomorrow, clouds, or no clouds. must happen, 1.0
2) That the baby is a boy. .5
3) That tomorrow is Christmas Day. Note: "tomorrow" could be anyday in 365 days! $\frac{1}{365}$
4) Of getting a six by tossing a die. $\frac{1}{6}$
5) Of getting a Head by tossing a coin. $\frac{1}{2}$
6) That today is Tuesday. $\frac{1}{7}$
7) That this is the month of June. $\frac{1}{12}$
8) Of drawing a Heart from a pack of playing cards. $\frac{1}{4}$
9) There is school today. $\frac{5}{7}$
10) That the teacher will call on a boy to answer the question. $\frac{1}{2}$

Now after guessing what ratings to give the above items, try putting each on a mathematical basis. Item 3 might be $\frac{1}{365}$. Why?

Using A Metric Ruler

The great value of a metric scale is that the divisions are in tenths. This is a useful number system —— using tenths and not sixteenths, as on the English ruler. The metric system is used in other countries more than in the United States. The smallest divisions on a metric ruler are millimeters; numbers may be placed at each centimeter.

Give the lengths of the following lines, first in centimeters, and then in millimeters.

Example: 9.7cm, 97mm

1) 8.0 cm, 88 mm

2) 10 cm, 100 mm

3) 5.7 cm, 57 mm

4) 11.5 cm, 115 mm

5) 2.3 cm, 23 mm

6) 9.2 cm, 92 mm

7) 6.4 cm, 64 mm

8) 10.5 cm, 105 mm

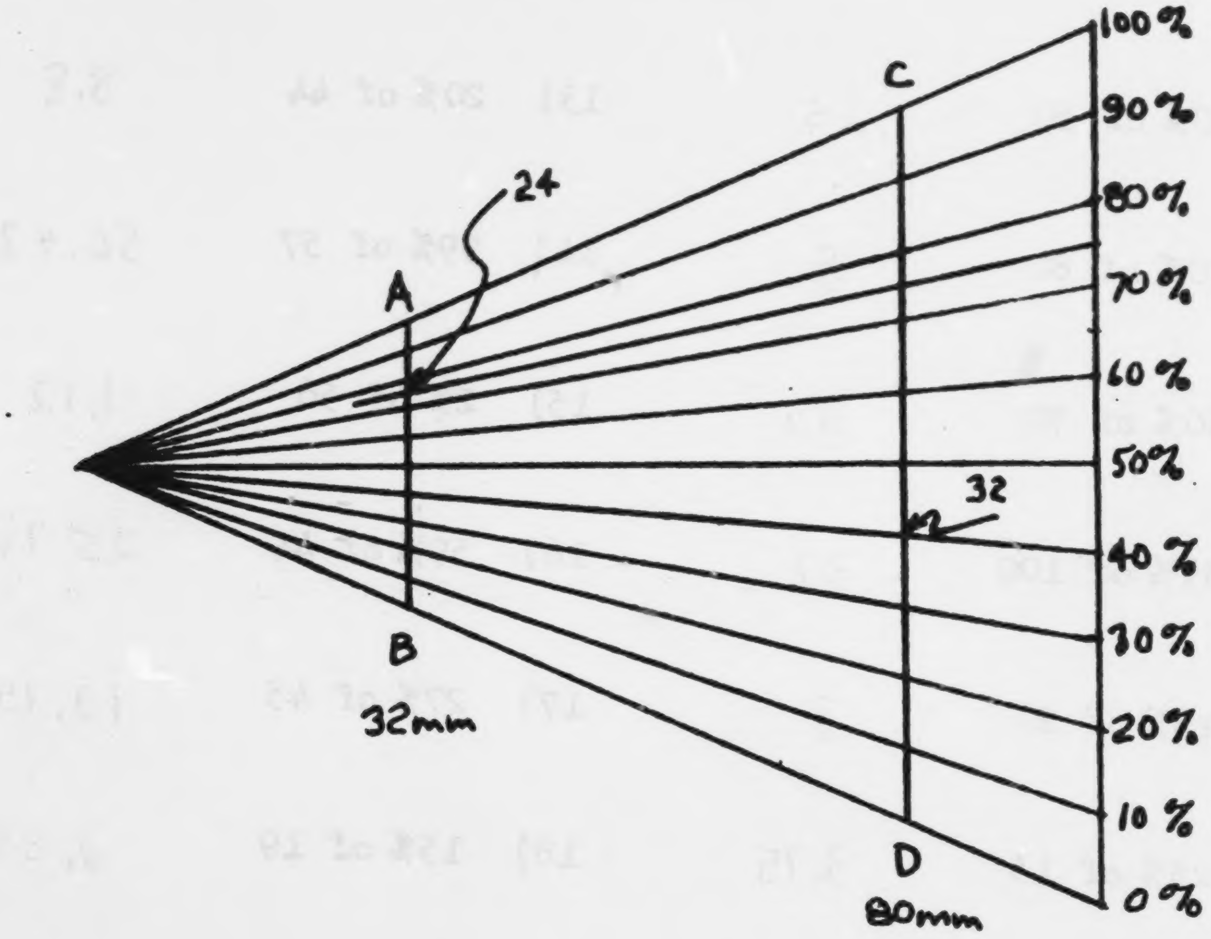
9) 4.9 cm, 49 mm

10) 7.5 cm, 75 mm

ditto
available

Nomographs Do Everything

A nomograph is a lazy man's way of doing a mathematical problem. Here, for example, is a way to figure the percent of a number with no effort at all. The answers may be approximate, however.



The student can draw this nomograph larger, or use this one shown here. The idea is to lay a metric scale across the graph as in lines AB and CD. 32 and 80 are millimeters on the scale. 40% of 80 is a problem done by finding where the 40% line crosses under the scale. Answer: 32. Problem: 75% of 32. Exercise care in finding 75%. Answer: 24

ditto available

Problems to Solve on the Nomograph

1) 60% of 90	54
2) 90% of 45	40.5
3) 50% of 50	25
4) 10% of 80	8
5) 50% of 70	35
6) 37% of 100	37
7) 15% of 20	3
8) 25% of 15	3.75
9) 72% of 90	64.8
10) 12% of 20	2.4
11) 15% of 14	2.1
12) 5% of 20	1
13) 20% of 44	8.8
14) 99% of 57	56.43
15) 2% of 56	1.12
16) 59% of 44	25.76
17) 27% of 45	12.15
18) 15% of 19	2.85
19) 59% of 55	32.45
20) 67% of 97	64.99

ditto available

A Add and reduce the sum to lowest terms:

1) $\begin{array}{r}\frac{1}{2}\\ \frac{3}{4}\\ \hline 1\frac{1}{4}\end{array}$
2) $\begin{array}{r}\frac{1}{4}\\ \frac{2}{3}\\ \hline \frac{11}{12}\end{array}$
3) $\begin{array}{r}\frac{3}{4}\\ \frac{4}{5}\\ \hline 1\frac{11}{20}\end{array}$
4) $\begin{array}{r}\frac{2}{3}\\ \frac{1}{6}\\ \hline \frac{5}{6}\end{array}$
5) $\begin{array}{r}\frac{1}{7}\\ \frac{3}{14}\\ \hline \frac{5}{14}\end{array}$

6) $\begin{array}{r}\frac{1}{2}\\ \frac{2}{3}\\ \hline \frac{5}{6}\end{array}$
7) $\begin{array}{r}\frac{1}{4}\\ \frac{1}{3}\\ \hline \frac{7}{12}\end{array}$
8) $\begin{array}{r}\frac{1}{2}\\ \frac{1}{3}\\ \hline \frac{5}{6}\end{array}$
9) $\begin{array}{r}\frac{1}{6}\\ \frac{1}{8}\\ \hline \frac{7}{24}\end{array}$
10) $\begin{array}{r}\frac{5}{9}\\ \frac{1}{3}\\ \hline \frac{8}{9}\end{array}$

11) $\begin{array}{r}\frac{5}{6}\\ \frac{3}{8}\\ \hline 1\frac{5}{24}\end{array}$
12) $\begin{array}{r}\frac{1}{5}\\ \frac{3}{10}\\ \hline \frac{1}{2}\end{array}$
13) $\begin{array}{r}\frac{2}{25}\\ \frac{3}{5}\\ \hline \frac{17}{25}\end{array}$
14) $\begin{array}{r}\frac{1}{4}\\ \frac{1}{6}\\ \hline \frac{5}{12}\end{array}$
15) $\begin{array}{r}\frac{6}{7}\\ \frac{1}{14}\\ \hline \frac{13}{14}\end{array}$

16) $\begin{array}{r}\frac{1}{5}\\ \frac{3}{2}\\ \hline 1\frac{7}{10}\end{array}$
17) $\begin{array}{r}\frac{4}{5}\\ \frac{3}{10}\\ \hline 1\frac{1}{10}\end{array}$
18) $\begin{array}{r}\frac{1}{2}\\ \frac{2}{5}\\ \hline \frac{9}{10}\end{array}$
19) $\begin{array}{r}\frac{4}{5}\\ \frac{1}{10}\\ \hline \frac{9}{10}\end{array}$
20) $\begin{array}{r}\frac{1}{3}\\ \frac{5}{6}\\ \hline 1\frac{1}{6}\end{array}$

21) $\begin{array}{r}\frac{1}{12}\\ \frac{3}{6}\\ \hline \frac{7}{12}\end{array}$
22) $\begin{array}{r}\frac{1}{6}\\ \frac{3}{4}\\ \hline \frac{11}{12}\end{array}$
23) $\begin{array}{r}\frac{1}{18}\\ \frac{5}{6}\\ \hline \frac{8}{9}\end{array}$
24) $\begin{array}{r}\frac{1}{3}\\ \frac{1}{9}\\ \hline \frac{4}{9}\end{array}$
25) $\begin{array}{r}\frac{1}{2}\\ \frac{3}{10}\\ \hline \frac{4}{5}\end{array}$

ditto available

A **Multiply and reduce the product to lowest terms**

1) $\frac{1}{3} \times \frac{2}{5}$ $\frac{2}{15}$

2) $\frac{1}{4} \times \frac{1}{3}$ $\frac{1}{12}$

3) $\frac{2}{3} \times \frac{1}{6}$ $\frac{1}{9}$

4) $\frac{1}{9} \times \frac{3}{5}$ $\frac{1}{15}$

5) $\frac{4}{7} \times \frac{5}{9}$ $\frac{20}{63}$

6) $\frac{1}{3} \times \frac{5}{6}$ $\frac{5}{18}$

7) $\frac{1}{5} \times \frac{2}{3}$ $\frac{2}{15}$

8) $\frac{2}{3} \times \frac{3}{5}$ $\frac{2}{5}$

9) $\frac{3}{5} \times \frac{1}{6}$ $\frac{1}{10}$

10) $\frac{1}{9} \times \frac{10}{11}$ $\frac{10}{99}$

11) $\frac{1}{3} \times \frac{1}{7}$ $\frac{1}{21}$

12) $\frac{1}{8} \times \frac{3}{4}$ $\frac{3}{32}$

13) $\frac{1}{12} \times \frac{3}{4}$ $\frac{1}{16}$

14) $\frac{5}{6} \times \frac{7}{9}$ $\frac{35}{54}$

15) $\frac{6}{7} \times \frac{1}{5}$ $\frac{6}{35}$

16) $\frac{4}{5} \times \frac{3}{5}$ $\frac{12}{25}$

17) $\frac{9}{10} \times \frac{15}{16}$ $\frac{27}{32}$

18) $\frac{5}{6} \times \frac{7}{9}$ $\frac{35}{54}$

19) $\frac{4}{5} \times \frac{1}{3}$ $\frac{4}{15}$

20) $\frac{1}{7} \times \frac{4}{5}$ $\frac{4}{35}$

ditto available

Fraction Practice

Probability problems often involve adding or multiplying fractions.

Reduce the results to lowest terms.

A Add the following:

1) $\begin{array}{c}\frac{1}{2}\\ \frac{1}{2}\\ \frac{1}{2}\\ \hline 1\frac{1}{2}\end{array}$

2) $\begin{array}{c}\frac{1}{2}\\ \frac{2}{3}\\ \frac{2}{3}\\ \hline 1\frac{5}{6}\end{array}$

3) $\begin{array}{c}\frac{3}{4}\\ \frac{1}{4}\\ \frac{1}{3}\\ \hline 1\frac{1}{3}\end{array}$

4) $\begin{array}{c}\frac{1}{6}\\ \frac{1}{8}\\ \frac{3}{8}\\ \hline \frac{2}{3}\end{array}$

5) $\begin{array}{c}\frac{2}{3}\\ \frac{1}{8}\\ \frac{1}{6}\\ \hline \frac{23}{24}\end{array}$

6) $\begin{array}{c}\frac{1}{2}\\ \frac{3}{4}\\ \frac{1}{3}\\ \hline 1\frac{7}{12}\end{array}$

7) $\begin{array}{c}\frac{2}{5}\\ \frac{24}{25}\\ \frac{1}{5}\\ \hline 1\frac{14}{25}\end{array}$

8) $\begin{array}{c}\frac{1}{4}\\ \frac{3}{8}\\ \frac{1}{2}\\ \hline 1\frac{1}{8}\end{array}$

B Multiply the following:

9) $\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3}$ $\frac{1}{27}$

10) $\frac{2}{5} \times \frac{1}{3} \times \frac{1}{4}$ $\frac{1}{30}$

11) $\frac{1}{6} \times \frac{1}{6} \times \frac{1}{3}$ $\frac{1}{108}$

12) $\frac{1}{2} \times \frac{2}{3} \times \frac{1}{6}$ $\frac{1}{18}$

13) $\frac{1}{9} \times \frac{1}{3} \times \frac{3}{4}$ $\frac{1}{36}$

14) $\frac{1}{4} \times \frac{1}{3} \times \frac{2}{3}$ $\frac{1}{18}$

15) $\frac{2}{3} \times \frac{1}{7} \times \frac{7}{9}$ $\frac{2}{27}$

16) $\frac{4}{5} \times \frac{1}{10} \times \frac{1}{3}$ $\frac{2}{75}$

17) $\frac{3}{4} \times \frac{1}{9} \times \frac{1}{2}$ $\frac{1}{24}$

18) $\frac{1}{6} \times \frac{1}{5} \times \frac{1}{2}$ $\frac{1}{60}$

ditto available

Handling Decimal Fractions

Change these simple fractions to decimal fractions:

Example: $\frac{1}{2} = .5,\ 2\overset{.5}{\overline{)1.0}}$

1) $\frac{1}{2}$ .5
2) $\frac{1}{4}$ .25
3) $\frac{1}{5}$ .2
4) $\frac{1}{8}$ .125
5) $\frac{3}{4}$ .75
6) $\frac{3}{8}$ .375
7) $\frac{5}{8}$ .625
8) $\frac{1}{16}$ .0625
9) $\frac{1}{10}$ .1
10) $\frac{1}{20}$ .05

Change these decimal fractions to percents. Think of % as $\frac{1}{100}$.

Thus $.50 = \frac{50}{100} = 50 \times \frac{1}{100} = 50\%$

11) .10 10%
12) .80 80%
13) .50 50%
14) .20 20%
15) .25 25%
16) .75 75%
17) .90 90%
18) .32 32%
19) .08 8%
20) $.33\frac{1}{3}$ $33\frac{1}{3}\%$

Recording Heads and Tails

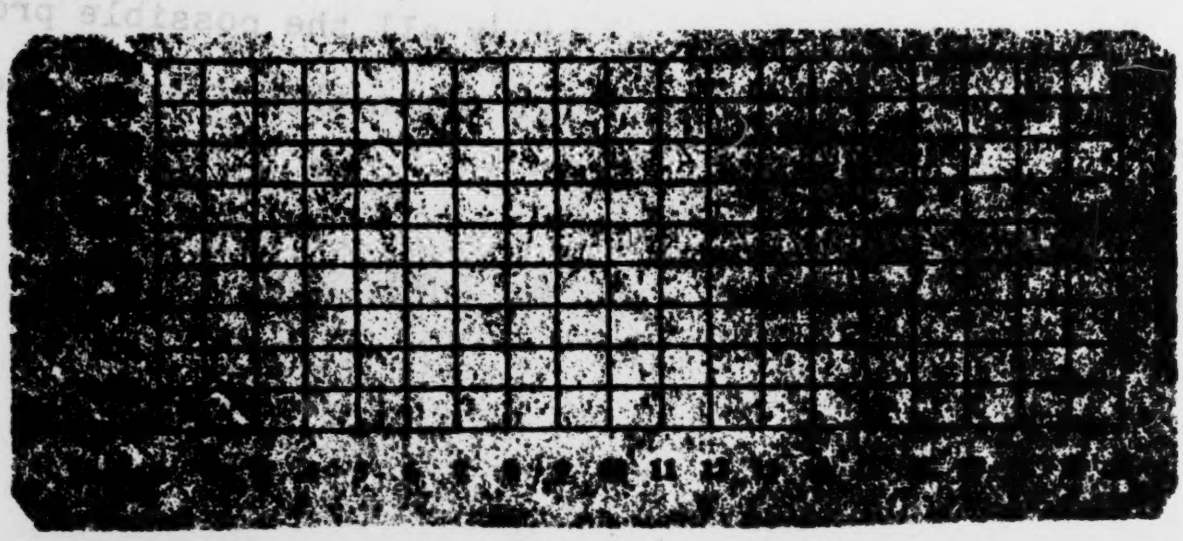
Is there really a"50-50 chance", or a "one in two" probability of getting a Head when a coin is tossed? Only by many trials does this mathematical prediction prove correct. Make a chart and keep the record of 20 tosses.

A

Toss Number	1	2	3			20
Number of Heads						
Number of Tails						
Cumulative Number of Heads						
Ratio of Heads to Toss						
Per Cent Heads						

What is the final percent in the lower right hand corner? Is it near 50% ? How do you explain this ? Let's make a graph of what is happening to the percent of Heads as more tosses are made.

B



Probability and Sample Spaces

Probability is concerned with the number successes out of the total number of possibilities. All the possible combinations of numbers from two dice can be shown in a Sample Space. The first line of the Sample Space would look like this:

(1,1), (1,2), (1,3), (1,4), (1,5), (1,6)

This means that 1 showing up on one die, might be matched with any one of the six numbers on the other die. There follows a problem in completing this Sample Space.

A pair of dice affords many interesting problems. See the following pages. To find all the possible sums that might appear in tossing two dice the first line of a Sample Space might look like this:

(2), (3), (4), (5), (6), (7)

Another problem might be to study all the possible products of the numbers on a pair of dice. Here again the first line of the Sample Space would look like this:

(1), (2), (3), (4), (5), (6)

Sample Spaces

"Sample spaces" are pictures of the various ways in which an event may occur. The set of results when a coin is tossed is written like this: {H,T}. If there are two colored balls, R (red) and G (green), which can roll out of a machine, they might roll out in this order: {RG, GR}. But if a third B (blue) ball is added, the Sample Space, or list of possibilities is: {RGB, RBG, GRB, GBR, BRG, BGR}. The Probability of rolling GRB, in that order is $\frac{1}{6}$.

All the possible combinations of numbers from the faces of two dice can be worked out and displayed in a Sample Space. Complete the following.

1,1	1,2	1,3					
2,1							
		3,3					

(You may not need all the spaces.)

Sample Spaces

A **Complete the following. This is an Addition Table:**

	1	2	3	4	5	6	7	8	9	10
1							8			
2			5							
3							10			
4										

Complete this one. It is a Multiplication Table:

	1	2	3	4	5	6	7	8	9	10	11	12
1												
2				8								
3												
4							28				44	
5												
6												

Projects:

Try making two more Sample Spaces, or Tables, extending the numbers from 6 to 10 in each case.

Little available

B Think of two piles of slips of paper. Each pile has ten slips of paper in it. Each slip of paper has a fraction written on it. If you were to take one slip from each pile, and multiply the fraction, all the possible products might look like this:

	$\frac{1}{1}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{1}{7}$	$\frac{1}{8}$	$\frac{1}{9}$	$\frac{1}{10}$
$\frac{1}{1}$									$\frac{1}{9}$	
$\frac{1}{2}$										
$\frac{1}{3}$										
$\frac{1}{4}$					$\frac{1}{20}$					
$\frac{1}{5}$										
$\frac{1}{6}$										
$\frac{1}{7}$										
$\frac{1}{8}$										
$\frac{1}{9}$									$\frac{1}{81}$	
$\frac{1}{10}$										

Complete the above Sample Space. What would be the Probability of drawing a slip from each pile and getting a product of $\frac{1}{6}$?

ditto available

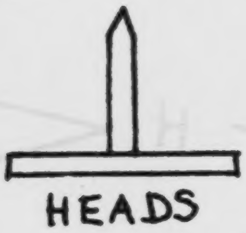
C A variation of what is described on the previous page is to use decimal fractions, and not just simple fraction. A game can be made out of this idea also. Complete the following Sample Space.

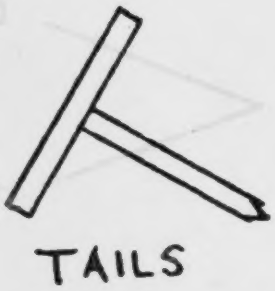
	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.1										
.2										
.3			.09							
.4										
.5										
.6										
.7										
.8							.56			
.9										
1.0										

Finding Probability Through Experience

Sometimes the mathematical probability is not easy to find. But by keeping records, one can figure the probability on the basis of actual experience.

Draw up forms like those on the preceding page. Examine a thumbtack: Call these positions H and T.





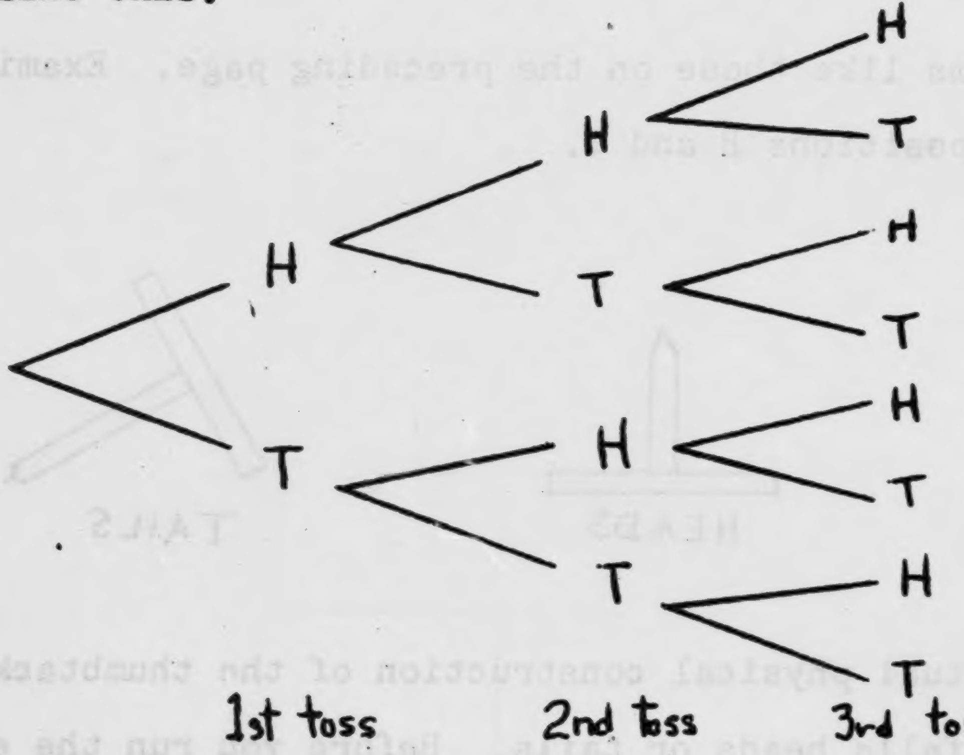
The actual physical construction of the thumbtack will determine whether it falls heads or tails. Before you run the experiment, write down a guess as to which way your thumbtack will fall most frequently.

A fat checker is an interesting subject. It can fall on either side, or on its edge. Make a chart like this and determine P (H), P (T), P (E), for 20 tosses.

Toss Number	1	2	3	4	20
Heads					
Tails					
Edge					

Probability Tree

A "tree" is sometimes valuable for showing all the possible results of some events. For example, to toss a single coin three times looks like this.



Now you can ask the question, what is the probability of getting 3H in 3 tosses of a coin ? Tracing it out above, you see that is is $\frac{1}{8}$. To get an exact order such as HTT, is also $\frac{1}{8}$. Simply to get two tails and one head is $\frac{3}{8}$. (Try keeping a record of tossing three coins eight times.)

Toss Number	1	2	3	4	5	6	7	8	Total
H H H									
H H T T T H									
T T T									

ditto
available

Which Is More Probable ?

Which is more likely, or probable ? One success out of two possibilities, or one success out of four possibilities ? It is easy to decide if we convert the fractions to percent, and choose the largest. For example: $\frac{1}{2}$ or $\frac{1}{4}$? means 50% or 25% ? Thus an event $\frac{1}{2}$ is more probable than $\frac{1}{4}$.

1) $\frac{1}{4}$ or $\frac{1}{8}$? $\frac{1}{4}$

2) $\frac{2}{3}$ or $\frac{3}{4}$? $\frac{3}{4}$

3) $\frac{1}{2}$ or $\frac{3}{5}$? $\frac{3}{5}$

4) $\frac{1}{6}$ or $\frac{3}{4}$? $\frac{3}{4}$

5) $\frac{1}{16}$ or $\frac{3}{8}$? $\frac{3}{8}$

6) $\frac{1}{4}$ or $\frac{3}{4}$? $\frac{3}{4}$

7) $\frac{1}{16}$ or $\frac{1}{8}$? $\frac{1}{8}$

8) $\frac{1}{10}$ or $\frac{1}{5}$? $\frac{1}{5}$

9) $\frac{1}{6}$ or $\frac{1}{3}$? $\frac{1}{3}$

10) $\frac{2}{3}$ or $\frac{5}{6}$? $\frac{5}{6}$

11) $\frac{1}{8}$ or $\frac{1}{5}$? $\frac{1}{5}$

12) $\frac{1}{6}$ or $\frac{1}{10}$? $\frac{1}{6}$

13) $\frac{1}{4}$ or $\frac{1}{3}$? $\frac{1}{3}$

14) $\frac{1}{10}$ or $\frac{3}{5}$? $\frac{3}{5}$

15) $\frac{1}{3}$ or $\frac{1}{6}$? $\frac{1}{3}$

16) $\frac{1}{6}$ or $\frac{1}{4}$? $\frac{1}{4}$

17) $\frac{1}{12}$ or $\frac{3}{4}$? $\frac{3}{4}$

18) $\frac{3}{4}$ or $\frac{1}{3}$? $\frac{3}{4}$

19) $\frac{1}{8}$ or $\frac{9}{10}$? $\frac{9}{10}$

20) $\frac{1}{6}$ or $\frac{1}{5}$? $\frac{1}{5}$

ditto available

EVERYBODY WINS

$2.00 FOR 25¢ ON ANY ONE NUMBER
50¢ FOR 25¢ ON ANY COLOR
35¢ FOR 25¢ WHEN YOU PLAY
FOR EVEN NUMBERS

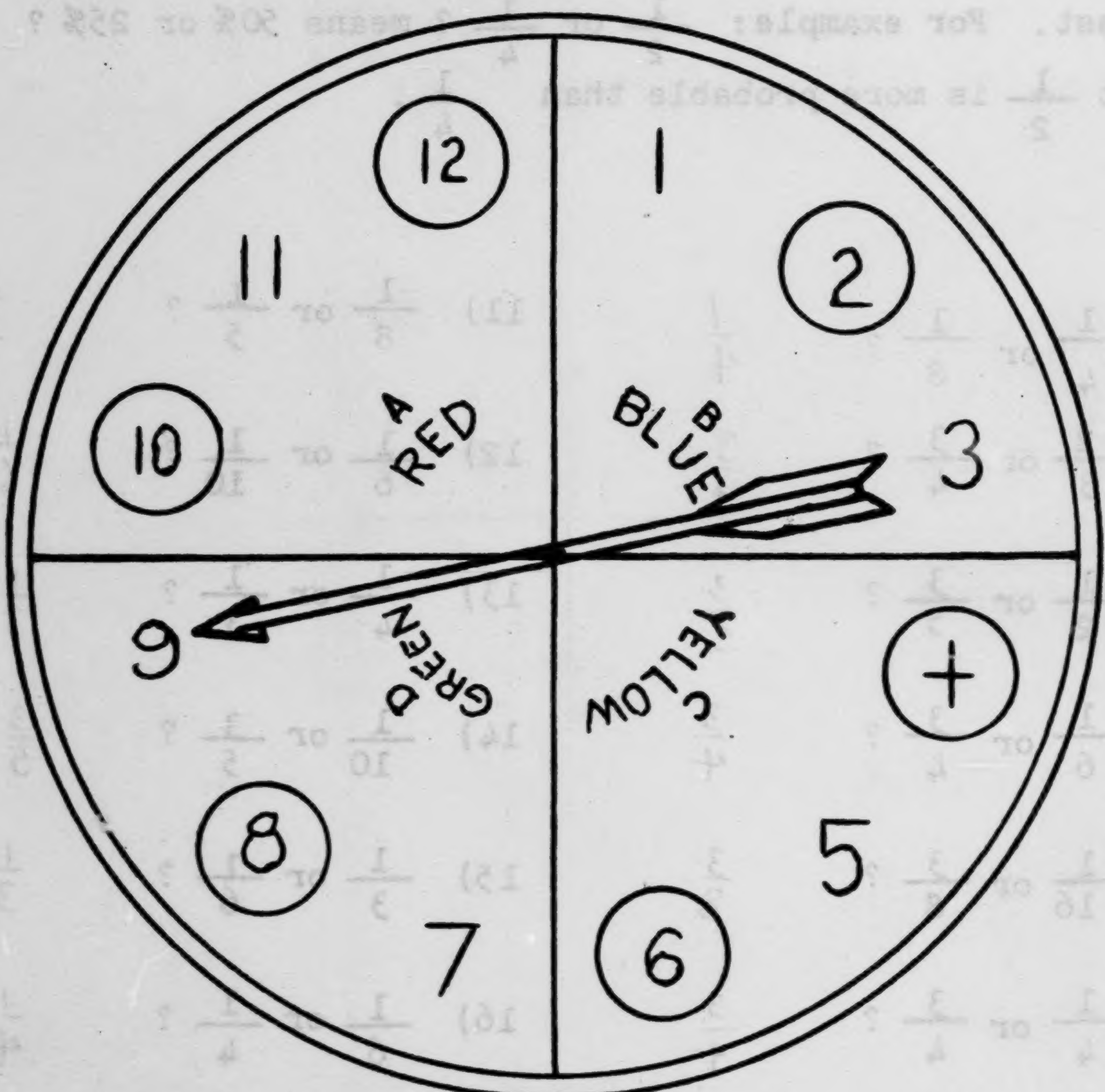

12
1
11
2
10
3
A RED
B BLUE
9
4
D GREEN
C YELLOW
8
5
7
6

Figure out the mathematical probability for each of the above propositions. Why does the player not receive $3.00 instead of $2.00; $1.00 instead of 50¢ of 50¢ instead of 35¢ ? (A pencil balanced on a thumbtack makes a good spinner to place right on this drawing.) Keep records of all your trials.

How A Spinner Works

Everybody likes to watch the "Wheel of Fortune" spin at the Amusement Park. Some people place their money to see if they can win something. Note the "wheel" on the following page. If you play a quarter, what chance do you have of winning $3.00 ? If you play a single number, you have one chance in twelve of winning $3.00. But you need to play a number 12 times to expect to win once. $3.00 is the figure chosen because it represents 12 x $.25

Answer the following questions on the "Wheel of Fortune"

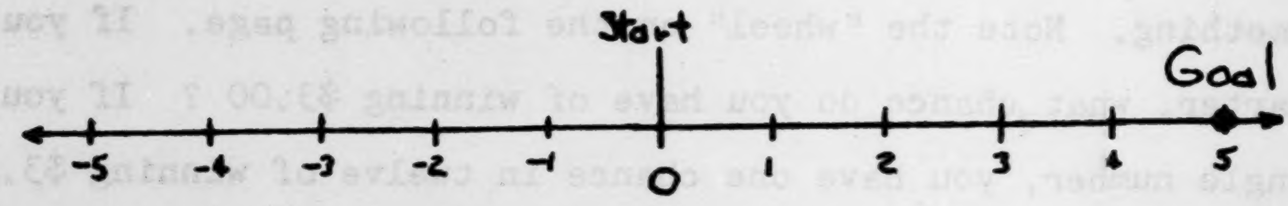
1) What are the chances of winning on an even number ?
2) What are the chances of winning on an odd number ?
3) What is the Probability of winning in area A ?
4) What is the Probability of winning in area B or D ?
5) What is the Probability of getting an "8" ?

Use a sheet of paper to record the actual results of each spin of the pencil-pointer. (A lead pencil balanced on a thumbtack will spin easily on the flattened page.)

Spin	1	2	3	4	5	6	7	8	9	10	11	12
Result												

A Random Walk

A Here is a walk you can take without leaving your desk. All you need is a coin, pencil, and paper.



Some Experiments in "walking".

a) Let Heads be 5 steps forward; Tails be one step backward. How soon can you get from start to goal by tossing a coin and moving accordingly ?

b) Let H = 2 steps forward; T = 1 step backward.

c) Let H = 1 step forward; T = 1 step backward.

Will you ever get from start to goal ?

B Try walking to get out of the Square.

Draw a grid like this one. Observe the following rules.

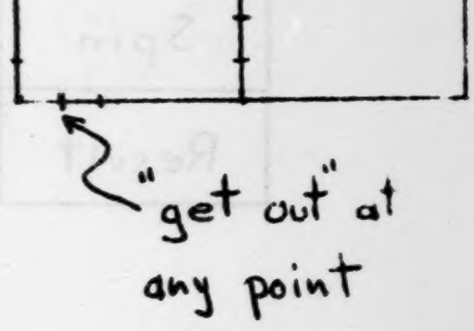
Toss a dime and a quarter.

Dime: H, Take one step, Face left

T, Take one step, Face right

Quarter: H, take two steps, Face left

T, take two steps, Face right



An Important Use Of Probability

A Mortality Table is most important to the Insurance business. This Table predicts the life expectancy of individuals living in the United States. When you buy life insurance the company can tell about how long you will live "probably."

Age	Number Living	Deaths Each Year	Deaths Per 1,000
0	10,000,000	70,800	7.08
1	9,929,200	17,475	1.76
2	9,911,725	15,066	1.52
3	9,896,659	14,449	1.46
4	9,882,210	13,835	1.40
5	9,868,375	13,322	1.35
6	9,855,053	12,812	1.30
7	9,842,241	12,401	1.26
8	9,829,840	12,091	1.23
9	9,817,749	11,879	1.21
10	9,805,870	11,865	1.21
11	9,794,005	12,047	1.23
12	9,781,958	12,325	1.26
13	9,769,633	12,896	1.32
14	9,756,737	13,562	1.39
15	9,743,175	14,225	1.46
16	9,728,950	14,983	1.54
17	9,713,967	15,737	1.62
18	9,698,230	16,390	1.69
19	9,681,840	16,846	1.74
20	9,664,994	17,300	1.79
21	9,647,694	17,655	1.83
22	9,630,039	17,912	1.86
23	9,612,127	18,167	1.89
24	9,593,960	18,324	1.91
25	9,575,636	18,481	1.93
26	9,557,155	18,732	1.96
27	9,538,423	18,981	1.99
28	9,519,442	19,324	2.03
29	9,500,118	19,760	2.08
30	9,480,358	20,193	2.13
31	9,460,165	20,718	2.19
32	9,439,447	21,239	2.25
33	9,418,208	21,850	2.32
34	9,396,358	22,551	2.40
35	9,373,807	23,528	2.51
36	9,350,279	24,685	2.64
37	9,325,594	26,112	2.80
38	9,299,482	27,991	3.01
39	9,271,491	30,132	3.25
40	9,241,359	32,622	3.53
41	9,208,737	35,362	3.84
42	9,173,375	38,253	4.17
43	9,135,122	41,382	4.53
44	9,093,740	44,741	4.92
45	9,048,999	48,412	5.35
46	9,000,587	52,473	5.83
47	8,948,114	56,910	6.36
48	8,891,204	61,794	6.95
49	8,829,410	67,104	7.60
50	8,762,306	72,902	8.32
51	8,689,404	79,160	9.11
52	8,610,244	85,758	9.96
53	8,524,486	92,832	10.89
54	8,431,654	100,337	11.90
55	8,331,317	108,307	13.00
56	8,223,010	116,849	14.21
57	8,106,161	125,970	15.54
58	7,980,191	135,663	17.00
59	7,844,528	145,830	18.59
60	7,698,698	156,592	20.34
61	7,542,106	167,736	22.24
62	7,374,370	179,271	24.31
63	7,195,099	191,174	26.57
64	7,003,925	203,394	29.04
65	6,800,531	215,917	31.75
66	6,584,614	228,749	34.74
67	6,355,865	241,777	38.04
68	6,114,088	254,835	41.68
69	5,859,253	267,241	45.61
70	5,592,012	278,426	49.79
71	5,313,586	287,731	54.15
72	5,025,855	294,766	58.65
73	4,731,089	299,289	63.26
74	4,431,800	301,894	68.12
75	4,129,906	303,011	73.37
76	3,826,895	303,014	79.18
77	3,523,881	301,997	85.70
78	3,221,884	299,829	93.06
79	2,922,055	295,683	101.19
80	2,626,372	288,848	109.98
81	2,337,524	278,983	119.35
82	2,058,541	265,902	129.17
83	1,792,639	249,858	139.38
84	1,542,781	231,433	150.01
85	1,311,348	211,311	161.14
86	1,100,037	190,108	172.82
87	909,929	168,455	185.13
88	741,474	146,997	198.25
89	594,477	126,303	212.46
90	468,174	106,809	228.14
91	361,365	88,813	245.77
92	272,552	72,480	265.93
93	200,072	57,881	289.30
94	142,191	45,026	316.66
95	97,165	34,128	351.24
96	63,037	25,250	400.56
97	37,787	18,456	488.42
98	19,331	12,916	668.15
99	6,415	6,415	1,000.00

What is the Probability of a student, age 15, living until he is 16 ? From the Table, 1.46 over 1000 gives .146% deaths. Subtracting this from 100% we get the Probability of living as 99.854%. Figure out answers for people of ages 30, 50, 80, and 99.

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Some Uses Of Probability

When Probability provides a way of "predicting" an event, it is most valuable. Insurance companies could not operate at all if they were not able to "predict" accidents, or deaths. For example, the amount of the charge for the insurance policy is determined by the probability of the accident, or death, happening to the one insured.

Science uses volumes of recorded facts in trying to determine what causes a certain thing to happen. On the basis of many records kept on patients who smoked, and patients who got lung cancer, a "link" was established.

People who follow sports keep records on their favorite players. They may only memorize the records and not write them down. But by doing this, a sports fan might have a very good idea of the probability that a certain baseball player will get a hit.

A new thing one hears on the radio is, "the probability of rain is 60%," or some other per cent. This means that many factors in weather conditions are considered. and fed into a Computer which comes up with such a per cent as a forecast.

Conclusion

One of the most important and immediate use of Probability has to do with the personal safety of human beings. Since we are students attending school, we need to think seriously sometimes of what might happen in any week of school.

Refer back to the "Probability Scale" at the beginning of this unit. Place a word from the Scale, which you think is a good guess, after each sentence. A survey of the class experiences with each sentence during the last week would make these guesses realistic.

1) getting sick and needing to go home
2) getting sick and needing to go to the hospital
3) falling and needing to see the nurse
4) being struck by a thrown object
5) getting injured in a fight
6) blowing up the chemistry laboratory
7) getting an electrical shock in the radio shop
8) eating "bad" food in the cafeteria
9) falling out of a window
10) getting struck by a car on the way to school

Insurance companies consider these things very carefully. In almost every case there are safety measures and precautions students can take to avoid these difficulties. Obey the rules; this is basic.

CAR INSURANCE

UNIT IX

"Don't worry. I've got the right of way."
DANGER
Explosives

Most of you are looking forward to driving a car someday. With this driving comes a certain financial responsibility.

Car insurance is part of the financial picture. You should know the types of car insurances and how they protect you. You should also know the cost to you. To know these things and to be properly insured should make your driving experiences better. Without proper coverage a mishap can be costly and upsetting experience.

Do You Remember

Add:

1) $35.68
3.73
$39.41

2) $20.46
27.86
$48.32

3) $39.46
7.72
$47.18

4) $104.7
97.6
$202.39

Subtract:

5) $36.79
- 8.29
$28.50

6) $32.47
- 6.58
$25.89

7) $304.62
- 37.93
$266.69

8) $24.7
- 4.8
$19.89

Multiply:

9) $46.70
x 1.30
$60.71

10) $54.40
x 2.20
$119.68

11) $48.50
x 1.70
$82.45

12) $42.3
x 2.4
$101.52

Division:

13) 36.80)48.60 1.32

14) 24.50)35.70 1.45

14) 37.40 + 14.70 + 6.80 + 3.40 = 62.30

15) 42.60 + 12.50 + 6.80 + 5.40 = 67.30

16) 32.60 + 14.24 + 2.40 + 5.40 = 54.64
then multiply this answer by 1.40 = 76.496

17) 18.40 + 32.10 + 5.40 = 55.90
then multiply by 2.40 = 134.16

18) One person pays $54,40 while a second pays $46.80. The first is what percent larger than the second ? 10.6%

Let's Try Again

Add:

1) $52.39 + 4.21 = $57.10

2) $21.72 + 30.25 = $51.97

3) $40.19 + 7.63 = $47.82

4) $109.72 + 87.54 = $197.26

Subtract:

5) $37.48 - 16.27 = $21.21

6) $32.44 - 6.29 = $26.15

7) $307.61 - 32.92 = $274.69

8) $27.98 - 5.75 = $22.23

Multiply:

9) $47.19 x 1.40 = $66.0660

10) $52.15 x 2.30 = $119.9450

11) $49.61 x 1.60 = $79.3760

12) $43.16 x 2.40 = $103.5840

Division:

13) $36.70\overline{)73.40}$ 2

14) $24.30\overline{)798.42}$ 32.8

15) 37.29 + 14.67 + 6.74 + 3.29 = 61.99

16) 6.78 + 43.12 + 12.15 = 62.05

17) 33.40 + 14.27 + 2.70 + 5.12 = 56.49

then multiply this answer by 1.30 = 73.437

18) 18.73 + 33.09 + 5.67 = 57.49

then multiply by 2.20 = 126.478

Again

Add:

1) $37.92
3.26
#41.18

2) $20.47
27.87
#48.34

3) $38.43
7.98
#46.41

4) $107.98
98.52
#206.50

Subtract:

5) $37.98
- 14.73
$23.25

6) $37.48
- 6.73
#30.75

7) $309.62
- 38.94
#270.68

8) $27.94
- 4.63
#23.31

Multiply:

9) $46.90
x 1.30
#60.9700

10) $56.72
x 2.20
#124.7840

11) $48.49
x 1.70
#84.4430

12) $42.43
x 2.40
#101.832

Division:

13) 37.90)113.70 3

14) 25.40)15.24 .6

15) 37.40 + 16.29 + 14.32 + 6.70 = 74.71

16) 7.92 + 18.21 + 16 + 93 + 5.43 = 32.65

17) 32.67 + 19.21 + 71.18 = 123.06

then multiply by 2.71 = 333.4926

18) 16.72 + 19.21 + 43.60 = 79.53

then multiply by 1.30 = 103,3980

Insurance Vocabulary

Insurance

Property damage

Public Liability

Collision

Comprehensive

Medical Payment

Premium

Deductible

Semi-annual

Factor

Trained driver

Untrained driver

Good Student

These words are common to insurance. Let's see how many you know now.

Make special note of these as we go through the unit.

We shall check later to see if your vocabulary has increased.

There are five main types of car insurance. Property damage and bodily injury help to pay the other person. Collision, Comprehensive, and medical payment help you.

Property Damage - pays for damages done by your car.

Example - if you hit another person's car, his porch, drive across his lawn, it will help to pay the cost of repairs.

Bodily Injury - pays for damages or injuries to the other person. If you hit another person's car and injure a person or person's it helps pay for medical care and claims.

The types are 10/20, 15/30, 25/50, 50/100, and 100/300

Example - 25/50 means an allowance of $25,000 per person and $50,000 allowance per accident.

Collision - pays for damages to your own car. This policy is usually written as $50 or $100 deductible. It means that if damage is done to your car you will pay the first $50 or $100 and the balance will be paid by the insurance company.

There is also a 80/20 policy which means the company pays 80% while you pay 20%, up to $50.

Comprehensive - pays for damages from fire, theft, wind, hail, flood and other causes.

Medical payment - pays for medical expenses of passengers in your car up to specified amount.

For class discussion

A 1) Property Damage insurance:

a) Do you think this insurance should be required by law ?

b) Besides those listed, what other properties are commonly damaged .

c) If you hit another persons car and no one is in it, what would you do ?

d) What might happen if you didn't have this insurance.

2) Public liability insurance:

a) Do you think this insurance should be required by law ?

b) Besides striking another car, what other times would you use this insurance ?

c) What might happen if you didn't have this insurance ?

d) In Delaware are you responsible for persons riding in your car ?

3) Collision insurance:

a) Should this insurance be required by law ?

b) If a person in another car hits you and he is at fault would you use your collision insurance ? If yes, when ?

c) Which collision insurance will cost the most - $50 deductible ? $100 deductible ?

4) Comprehensive insurance:

a) Should this insurance be required by law ?

b) What other things, besides those mentioned, could be included ?

c) Suppose you had many little claims (payments to you) on the insurance what might happen ?

In the following Semi-Annual Base Prenium table we shall use sub-class 0. This is used for persons who have no driving points (accidents) against their record. You are put in a higher sub-class if you have drivers points against your record. Your premiums will be higher.

Age Group - refers to the age or year of the car
1 - (new car), 2 - (car 1 to 2 yrs. old), 3 - (car more than 2 yrs. old)

Cost Classification - refers to the size of the car and horse power. Larger cars with more horsepower have the higher classification Example:

Cadillacs are generally class 8 while Chevrolets are class 6.

The recommended amounts of property damage, bodily injury, and medical payment is darkened on the table.

NATIONWIDE AGENTS PORTFOLIO

Age 1 - (New)
Age 2 - (1-2 yrs. old)
Age 3 - (over 2 yrs.)

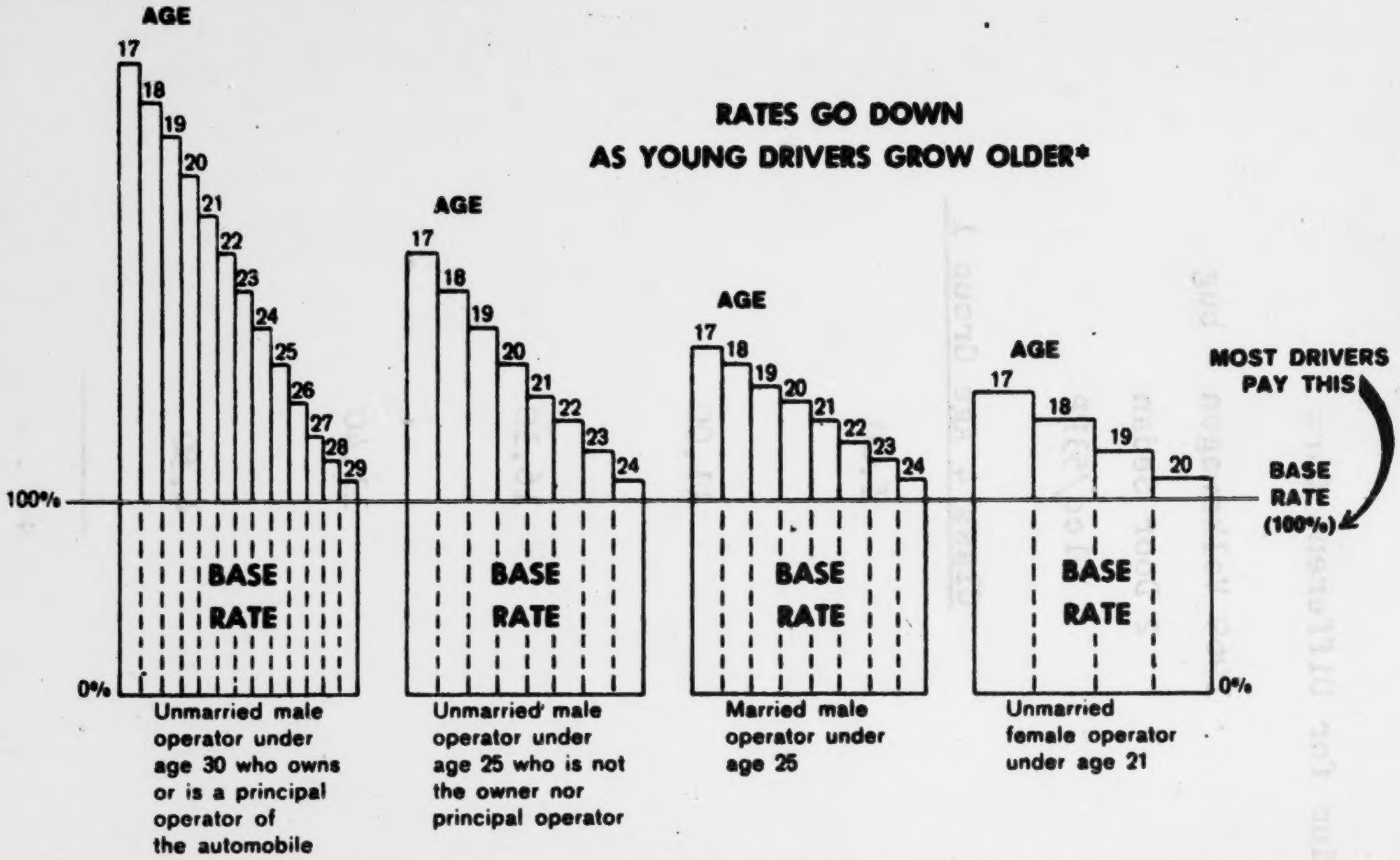
SEMI-ANNUAL BASE PREMIUMS FOR NON-FARM

TERR. ★ 03

SUB-CLASS	COV.	LIMITS	AGE GROUP	COST CLASSIFICATION (H.P and body) 1,2,3	4	5	6	7	8	9
0	COMP.	FULL COV.	1	4.00	5.00	6.40	7.40	9.00	11.00	13.00
			2	3.30	4.20	5.30	6.10	7.50	9.10	10.80
			3	2.80	3.50	4.50	5.20	6.30	7.70	9.10
	COLL.	80/20	1	19.30	22.70	26.10	27.70	29.50	31.80	34.10
			2	16.00	18.80	21.70	23.00	24.50	26.40	28.30
			3	13.50	15.90	18.30	19.40	20.70	22.30	23.90
		50 DED.	1	12.80	17.10	20.50	22.60	24.30	25.70	27.00
			2	10.60	14.20	17.00	18.80	20.20	21.30	22.40
			3	9.00	12.00	14.40	15.80	17.00	18.00	18.90
		100 DED.	1	7.20	11.00	13.80	16.00	17.10	17.80	18.70
-2- BASE X			2	6.00	9.10	11.50	13.30	14.20	14.80	15.50
			3	5.00	7.70	9.70	11.20	12.00	12.50	13.10

SUB-CLASS	PROPERTY DAMAGE		BODILY INJURY		MED. PAY. & FAM. COMP.	
-3- BASE X	5,000	13.50	10/20	9.80	500 MP	1.90
	10,000	14.80	15/30	10.60	1,000 MP	2.70
	25,000	16.10	25/50	11.40	2,000 MP	3.30
	50,000	16.90	50/100	12.30	5,000 MP	4.50
			100/300	13.10	FAM. COMP.	5.60

Base Rate and Age



* Based on a driver classification plan developed on behalf of a large segment of the business and effective in many states beginning in 1965. These comparisons are for private passenger cars used for pleasure where all operators have "clean" driving records. Adjustments in premiums are made for cars used to drive to work, used for business, or used on a farm. Adjustments are also made for youthful operators with driver training credit, drivers with "unclean" driving records, and owners of more than one car.

Now take time to compare these graphs with the proper rating tables.

Below are some statistics on the number of deaths on the Delaware roads from 1955 - 1968. Make a bar graph then discuss these in relation to car insurance.

1955 - 110
1956 - 87
1957 - 91
1958 - 84
1959 - 83

1960 - 87
1961 - 65
1962 - 94
1963 - 96
1963 - 96

1964 - 118
1965 - 112
1966 - 131
1967 - 136
1968 - 153

Example of Semi-Annual Premium for Different Cars

	1969 Malibu SS 396 2 Door Hardtop 325 Horsepower	1969 Volkswagon - bug 2 Door Sedan 91cc/53HP
	Class 6 Age Group 1	Class 4 Age Group 1
Comprehensive - (actual Cash value)	7.40	5.00
Collision - ($100 Deductible)	16.00	11.00
Property Damage - ($25000)	16.10	16.10
Bodily Injury - (25/50)	11.40	11.40
Medical Payment - (5000 per person)	4.50	4.50
6 months premium -	$55.40	$[illegible]

A Figure semi-annual (6 month) premiums.

	Class	Age Group	Comp.	Coll.	P.D.	B.I.	Medical Payment
1)	6	1	Yes	$50 ded.	$10000	25/50	$5000 7.40, 32.60, 14.80 11.40, 4.50 $70.70
2)	4	3	No	No	$10000	10/20	$2000 14.80, 9.80, 3.30 $27.90
3)	3	3	No	$100 ded.	$10000	10/20	$2000 5.00 14.80 9.80 3.30 $32.90
4)	8	1	Yes	80/20	$25000	50/100	Fam. Comp. 11.00 31.80 16.10 12.30 5.6 $76.80
5)	4	2	Yes	$100 ded.	$5000	15/30	$5000 4.20 9.10 13.50 10.60 4.50 $41.90

B 6) You bought a 1965 Cadillac (Class 8). You are not going to carry comprehensive or collision insurance. You are going to purchase $2000 medical payment, 10/20 bodily injury, and $10000 property damage. What is you semi-annual premium ?

$27.90

7) What is the semi-annual premium for a small foreign car (Class 3), 1968. The insurance carried will be $50 ded., $10000 property damage, 15/30 bodily injury, $5000 medical payment, and comprehensive.

$43.80

A Figure semi-annual (6 month) premiums in each case.

	Class	Age Group	Comp.	Coll.	P.D.	B.I.	Medical Payment
1)	5	2	Yes	$100 ded.	$10000	15/30	Fam. Comp. 5.30 11.30 14.80 10.60 5.60 #47.80
2)	4	3	No	No	$5000	10/20	$2000 13.50 9.80 3.30 #26.60
3)	6	1	Yes	$50 ded.	$10000	25/50	$5000 7.40 22.60 14.80 11.40 4.50 #60.70
4)	8	2	Yes	80/20	$25000	25/50	Fam. Comp. 9.10 27.70 16.10 11.40 5.60 #69.90
5)	6	1	Yes	$50 ded.	$10000	25/50	$5000 7.40 22.60 14.80 1..40 4.50 #60.70

B 6) You have a Volkswagon 1968 (Class 4) You want the following insurance: comprehensive, $50 deductible, Collision, $10000 property damage, 25/50 bodily injury, and $500 medical payment. What is premium ? #49.10

7) You bought a second-hand 1962 Chevrolet (Class 6) and are going to insure it. No collision or comprehensive, but $5000 (P.D.), 10/20 (B.I.) and $5000 medical payment were purchased. How much will you pay every six months. #25.20

8) You buy a new Ford (Class 5). What would it cost to insure it with top coverage for all except comprehensive (none). #96.00

A Figure semi-annual (6 month) premiums in each case.

	Class	Age Group	Comp.	Coll.	P.D.	B.I.	Medical Payment
1)	6	1	Yes	50 Ded.	10000	10/20	5000 7.40 22.60 14.80 9.80 1.90 $56.52
2)	8	3	Yes	No	10000	25/50	2000 7.70, 14.80, 11.40 3.30 $37.20
3)	4	2	Yes	100 Ded.	5000	15/30	2000 4.20, 9.10, 13.50 10.60, 3.30 $40.70
4)	3	1	Yes	80/20	10000	50/100	5000 4.00, 19.30, 14.80 12.30, 4.50 $54.90
5)	6	3	No	No	25000	50/100	Fam. Com. 16.10, 12.30, 5.60 $34.00

B 6) You have a 1967 Buick (Class 6) You want the following insurance coverage: full comprehensive coverage, $50 deductible, $25000 property damage coverage, 25/50 bodily injury, and $2000 medical payment. What is the semi-annual premium ? $55.70

7) You bought a 1965 used Custom Ford (Class 5) and went to take out insurance. How much will you pay semi-annually for $1000 property damage and 25/50 bodily injury ? Why do you think he might not take the other insurances ? $26.20

8) You are going to give your new Mercury (Class 6) top coverage in all the insurances. How much would it cost you for 6 months ?

$109.30

The Base Premium chart we have just studied applies to adults. There is a different premium paid if a younger person drives the car. This premium is figured by using the Classification Rating Factor Table which follows. It takes into account the age and also whether the individual is trained (passed Drivers Education) or untrained (has not taken Drivers Training). The trained person get cheaper rates.

To figure the rates you read from left to right under the columns showing male or female, unmarried or married, untrained or trained, then to the age. The number to right of this age is the factor. You multiply this times your base premiums figured from the adults table.

Example: Suppose your base premiums amounted to $55.40 from the base adult table and you were a male, unmarried, not owner of car, no Drivers Education, and age 18.

You would find the factor to be 2.20

The premiums would be 2.20 x $55.40 = $121.88

Example: A girl under these same conditions would have a factor of 1.50.

The premiums 1.50 x $55.40 = $83.10

CLASSIFICATION RATING FACTOR TABLE

NOT Applicable to Cars Owned by Corporations, Co-Partnerships or Unincorporated Associations

SEX	FAMILY STATUS	DRIVER TRAINING	AGE OF YOUNGEST OPERATOR	PLEASURE USE OR FARM USE	WORK LESS THAN 20 MILES	BUSINESS USE OR WORK 20 OR MORE MILES
Male & Female	Married or Unmarried (No Youthful Operators)	Trained or Untrained	Adults	1.00	1.10	1.50
Female	Unmarried (No other youthful operator)	★ Untrained	17*	1.60	1.70	2.10
			18	1.50	1.60	2.00
			19	1.40	1.50	1.90
			20	1.30	1.40	1.80
		★ Trained	17*	1.50	1.60	2.00
			18	1.40	1.50	1.90
			19	1.30	1.40	1.80
			20	1.20	1.30	1.70
Male	Unmarried (Not owner or principal operator)	★ Untrained	17*	2.40	2.50	2.90
			18	2.20	2.30	2.70
			19	2.10	2.20	2.60
			20	2.00	2.10	2.50
		★ Trained	17*	2.20	2.30	2.70
			18	2.10	2.20	2.60
			19	2.00	2.10	2.50
			20	1.90	2.00	2.40
		Trained or Untrained	21	1.80	1.90	2.30
			22	1.60	1.70	2.10
			23	1.40	1.50	1.90
			24	1.30	1.40	1.80
Male	Unmarried (Owner or principal operator)	Untrained	17*	4.10	4.20	4.60
			18	3.90	4.00	4.40
			19	3.40	3.50	3.90
			20	3.10	3.20	3.60
		Trained	17*	3.60	3.70	4.10
			18	3.50	3.60	4.00
			19	3.10	3.20	3.60
			20	3.00	3.10	3.50
		Trained or Untrained	21	2.90	3.00	3.40
			22	2.60	2.70	3.10
			23	2.40	2.50	2.90
			24	2.20	2.30	2.70
			25	2.00	2.10	2.50
			26	1.80	1.90	2.30
			27	1.60	1.70	2.10
			28	1.40	1.50	1.90
			29	1.30	1.40	1.80

A 1) What factor would you use in each case. Use car for pleasure;

a) male, unmarried, untrained, not owner, 18 years old 2.20

b) female, unmarried, trained, owner, 19 years old 1.30

c) male, unmarried, trained, owner, 21 years old 2.90

d) female, unmarried, trained, not owner, 18 years old 1.40

e) male, unmarried, untrained, not owner , 17 years old 2.40

B Find semi-annual premiums of cars used for pleasure;

Base Prem.	Sex	Family Status	Driver Training	Age	Owner or not	
2) $63.40	F	Single	Trained	19	owner	$82.42
3) $40.50	M	Single	Untrained	18	owner	$157.95
4) $48.60	M	Single	Untrained	19	owner	$165.24
5) $38.80	F	Single	Untrained	18	not	$58.20
6) $50.20	M	Single	Trained	20	owner	$150.60

C 7) Assume you are 18 years old, unmarried, and took drivers training. Suppose you bought a small 1969 car (Class 3) and took out $5000 property damage, 10/20 bodily injury, and $5000 medical payment. If you use the car for pleasure, how much semi-annual premium will you pay ?

male $58.38
female $38.92

A 1) What factor would you use for a car used for pleasure for:

a) female, unmarried, untrained, 18 years old, not owner 1.50
b) male, unmarried, not owner, 19 years old, untrained 2.10
c) male, unmarried, owner, trained, 18 years old 3.50
d) male, unmarried, not owner, trained, 20 yrs. old 1.90
e) male, unmarried, owner, untrained, 23 years old 2.40

B Find semi-annual premium:

	Base Prem.	Sex	Family Status	Driver Training	Age	Use	Owner or not	
2)	$48.00	F	Single	Trained	18	Pleasure	owner	$67.20
3)	$48.00	M	Single	Trained	18	Pleasure	owner	$68.00
4)	$60.50	M	Single	Untrained	19	Pleasure	not	$127.05
5)	$46.40	M	Single	Untrained	17	Pleasure	not	$111.36
6)	$54.60	F	Single	Untrained	19	Pleasure	owner	$76.44
7)	$50.00	M	Single	Untrained	21	Pleasure	owner	$170.00

C 8) You own a 1967 Chevrolet (Class 6). You are going to insure it for comprehensive, $50 deductible, P.D. ($10000), B.I. (10/20), and medical payment (5000). You are 19 years old, not married, and took Drivers Training in school. What would you expect to pay in premium each 6 months ?

Male $167.40
Female $70.20

A 1) What factor would you use for a car used for pleasure:

a) female, unmarried, trained, 19 years old, not owner. 1.30

b) male, unmarried, not owner, 18 years old, untrained. 2.20

c) male, unmarried, owner, trained, 19 years old. 2.10

d) male, untrained, owner, unmarried, 24 years old. 2.20

e) female, unmarried, untrained, owner, 20 years ols. 1.30

B Find semi-snnual premiums:

Base Prem.	Sex	Family Status	Drivers Training	Age	Use	Owner or not	
2) $50.00	F	Single	Trained	19	Pleasure	owner	$65.00
3) $55.40	M	Single	Trained	19	Pleasure	not	$110.80
4) $46.10	M	Single	Untrained	18	Pleasure	not	$179.79
5) $35.60	F	Single	Untrained	20	Pleasure	owner	$45.28
6) $65.40	M	Single	Trained	24	Pleasure	owner	$143.88

C 7) You buy a new Chevrolet (Class 6) and intend to insure it for comprehensive, $100 ded, $5000 property damage, 10/20 bodily injury, and $5000 medical payment. For this problem use your age, your sex, single, untrained, and use the car for pleasure. What premiums would you expect to pay every six months ?

Base $51.20 x pupil's individual factor

Car insurances, in addition to giving lower rates to the trained drivers, also give lower rates to the "good student"

Persons eligible for the "Good Student Discount" must meet the qualifications on the next page. The driver who meets these qualifications will be rated from the following table (Good Student Classification Rating Factor Table)

Example: In the previous work we found that an unmarried male age 18, untrained, not an owner had a factor of 2.20 If this same person was classified as a "good student" his factor from the following table would be 1.80

$55.40 (Base Premium) x 1.80 = $99.72

In this case you can see that he would save $22.16 on each semi-annual premium.

GOOD STUDENT DISCOUNT

A. The Good Student Classification Rating Factor is applicable provided:

1. The owner or operator is at least 16 years of age and is a junior (11th grade) or senior (12th grade) full-time high school student or enrolled as a full-time student in a college or university; and

2. Prior to the effective date of the policy or a renewal thereof, [redacted], the Company is furnished a statement certified by a school official indicating that the student has met one of the following requirements for the immediately preceding school semester or quarter (or comparable period):

   a. ranked among the upper 20 percent of his class scholastically, or

   b. in schools using letter grades, had a grade average of "B" or its equivalent or, if the system of letter grading cannot be averaged, no grade is below "B", or

   c. in schools using numerical grade points, such as 4, 3, 2 and 1 points, had an average of at least 3 points for all subjects combined, or

   d. was included in "Dean's List" "Honor Roll" or comparable list indicating scholastic achievement.

3. If the owner or operator is a full-time graduate student in a college or university, the Good Student Classification Rating Factor is applicable without the requirement for certification under A-2.

B. No policy is changed in term to effect a change in classification as a result of a change in the scholastic standing of any individual. Such change may be made only at the next renewal date.

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GOOD STUDENT CLASSIFICATION RATING FACTOR TABLE

Sex	Family Status	Driver Training	Age of Youngest Operator	Pleasure Use or Farm Use	Work Less Than 20 Miles	Business Use or Work 20 or More Miles
Female	Unmarried	Untrained	17*	1.40	1.50	1.90
			18	1.30	1.40	1.80
			19	1.20	1.30	1.70
			20	1.10	1.20	1.60
		Trained	17*	1.30	1.40	1.80
			18	1.20	1.30	1.70
			19	1.10	1.20	1.60
			20	1.00	1.10	1.50
Male	Unmarried (Not Owner or Principal Operator)	Untrained	17*	1.90	2.00	2.40
			18	1.80	1.90	2.30
			19	1.70	1.80	2.20
			20	1.60	1.70	2.10
		Trained	17*	1.70	1.80	2.20
			18	1.60	1.70	2.10
			19	1.50	1.60	2.00
			20	1.40	1.50	1.90
		Trained or Untrained	21	1.30	1.40	1.80
			22	1.20	1.30	1.70
			23	1.10	1.20	1.60
			24	1.00	1.10	1.50
Male	Unmarried (Owner or Principal Operator)	Untrained	17*	3.30	3.40	3.80
			18	3.10	3.20	3.60
			19	2.70	2.80	3.20
			20	2.50	2.60	3.00
		Trained	17*	2.80	2.90	3.30
			18	2.70	2.80	3.20
			19	2.40	2.50	2.90
			20	2.30	2.40	2.80
		Trained or Untrained	21	2.20	2.30	2.70
			22	2.10	2.20	2.60
			23	2.00	2.10	2.50
			24	2.00	2.10	2.50
Male	Married (No Youthful Unmarried Male Operator)	Untrained (With or Without Children)	17*	2.00	2.10	2.50
			18	1.90	2.00	2.40
			19	1.50	1.60	2.00
			20	1.40	1.50	1.90
		Trained (With or Without Children)	17*	1.80	1.90	2.30
			18	1.70	1.80	2.20
			19	1.40	1.50	1.90
			20	1.30	1.40	1.80
		Trained or Untrained (With Children)	21	1.20	1.30	1.70
			22	1.10	1.20	1.60
			23	1.00	1.10	1.50
			24	1.00	1.10	1.50
		Trained or Untrained (Without Children)	21	1.30	1.40	1.80
			22	1.20	1.30	1.70
			23	1.10	1.20	1.60
			24	1.00	1.10	1.50

*Age 17 or less.

A What factor would you use if you were a "good student". Pleasure Driver:

	Sex	Family Status	Driver Training	Age	Owner or not	
1)	M	Unmarried	Trained	18	owner	2.70
2)	M	Unmarried	Untrained	17	not	1.90
3)	M	Unmarried	Untrained	19	not	1.70
4)	F	Unmarried	Trained	19	not	1.50
5)	M	Unmarried	Trained	21	owner	2.20

B Find semi-annual premiums of car for pleasure:

	Base Prem.	Sex	Family Status	Driver Training	Age	Owner or not	
6)	$50.50	M	Unmarried	Trained	21	owner	$111.10
7)	$48.00	M	Unmarried	Trained	20	owner	$11040
8)	$36.00	F	Unmarried	Untrained	18	not	$4680
)	$64.00	M	Unmarried	Untrained	19	not	$108.80
10)	$72.00	M	Unmarried	Trained	17	not	$12240

C 11) You are a girl and a "good student" who owns a (Class 8) car for pleasure. You put the top insurance on it. You are 21 years old and have had drivers training. How much would your premiums be

A What factor would you use if you were a "good student" Pleasure driving:

	Sex	Family Status	Drivers Training	Age	Owner or not	
1)	M	Unmarried	trained	19	not	1.50
2)	F	Unmarried	trained	20	owner	1.20
3)	M	Unmarried	untrained	18	not	1.80
4)	M	Unmarried	untrained	23	not	1.10
5)	F	Unmarried	trained	18	not	1.60

B Find semi-annual premium of car for pleasure:

	Base Prem.	Sex	Family Status	Driver Training	Age	Owner or not	
6)	$30.00	M	Unmarried	Trained	20	owner	$6400
7)	$45.40	M	Unmarried	Untrained	18	not	$81.72
8)	$66.50	M	Unmarried	Untrained	17	owner	$126.35
9)	$50.80	F	Unmarried	Trained	20	owner	$5080
10)	$43.60	F	Unmarried	Untrained	19	not	$60.96

C 11) You bought a second-hand 1964 Plymonth (Class 6). If you are 20 and took drivers training. What premium would you pay if you were a "good student" and took out $5000 property damage, 10/20 bodily injury, and $2000 medical payment.

Male $61.18
Female $26.60

A What factor would you use in each case:

1) Single
19 yrs.
male
not owner
not a good student
untrained

2.10

2) Single
19 yrs.
male
not owner
good student
trained

1.50

3) What would be the difference on your semi-annual premiums if your base premium was $54.40 ?

$32.68

B 4) Using A 1) above what would be your semi-annual premium if you had a (class 4) car and took $5000 property damage, 10/20 bodily injury, and $5000 medical payment on this pleasure car.

$58.38

5) Under the same circumstance what would a person under A 2) pay every 6 months for the same car and insurance ?

$41.70

ditto available

Complete These

A 1) Semi-annual means every 6 months

2) A factor is a number which is multiplied

3) A trained driver is one who has taken drivers training

4) $34.70 x 2.40 is $83.38.

5) All factors are multiplied times the base rate.

6) The premium for $50 deductible is less then for $100 deductible.

7) A younger person's rate is more than an older person in most cases.

8) Insurance that takes care of other persons property is called property damage

9) The amount paid each month is the premium

10) Collision insurance comes in three types $50 deductible, $100 deductible, and 80/20.

11) A good student gets a lower rate than the average or low student.

12) The insurance which covers damage by hail stone is called comprehensive insurance.

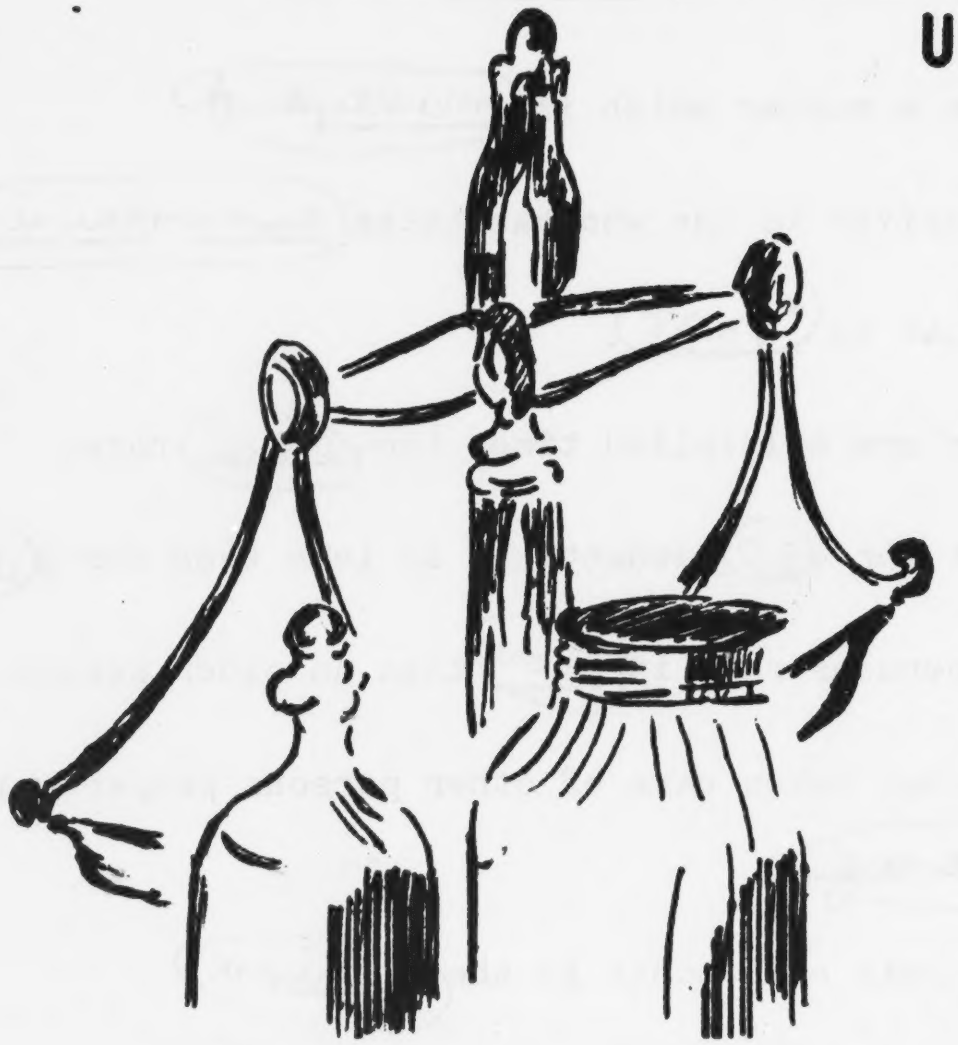
13) The written contract between the insurer and the insured is called policy.

14) Medical Payment insurance protects those persons in your automobile.

15) Financial protection in case of any mishap is given the name Insurance.

HOSPITAL WORK

UNIT X



Hospitals usually are in need of the help that both boys and girls can give. Some find employment in the summer time, others work in hospitals part-time during the year. Boys get jobs as orderlies, helpers, or assistants. Girls assist the nurses, do housekeeping jobs, or wait on the patients directly.

The math in this unit is aimed at helping such workers understand their jobs better.

Remember These !

1) Write as decimals

a) Three hundred five and six hundred four thousandths 305.604

b) Four and thirty seven thousandths 4.037

c) Seventeen and three hundred forty ten-thousandths 17.0340

2) Give the ratio and an equivalent form

a) Ratio of 8 to 12 8/12 or 2/3

b) What part of 28 is 8 ? 8/28 or 2/7

c) Six is what part of 20 ? 6/20 or 3/10

3) Add:

a) 3.174
.965
4.139

b) 4.07
1.94
6.01

c) 507.[illegible]
24.6
532.5

d) 3[illegible].[illegible]
[illegible]2
43.018

4) Multiply or divide:

a) 3.46
x 1.2
4.152

b) 40.06
x .24
9.6144

c) 3.42
x72.6
248.292

d) 4.026
x .324
1.304424

e) 16)4.26 7.1

f) .03)2.469 82.3

g) 1.8)5[illegible].22 32.9

5) Place in order from largest to smallest:

a) $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{5}{5}$ 5/5, 3/4 1/2, 3/8, 1/4

b) $\frac{5}{12}$, $\frac{2}{3}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{5}{8}$ 5/6, 2/3, 1/2, 5/12 1/4

c) $\frac{3}{4}$ $\frac{6}{12}$ $\frac{5}{24}$ $\frac{1}{2}$ $\frac{3}{8}$ 3/4, 6/12 or 1/2, 3/8, 5/24

d) 1.6, .02, 2.1, 166, 1 2.1, 1.6, 1, .66, .02

e) 3.8, 2.9, .66, .42, .5, .654 3.8, 2.9, .66, .654, .5, .42

f) 1, .76, .05, .682, 2.1, 1.9 2.1, 1.9, 1, .76, .682, .05

Try Again

1) Write as decimals

a) Five and three thousandths Five and three thousandths

b) Forty seven and three hundred five ten-thousandths Forty-seven and three hundred five ten-thousandths

c) Four hundred four and two hundredths Four hundred four and two hundredths

2) Give ratio and an equivalent form:

a) Ratio of 10 to 16 $\frac{10}{16}$ or $\frac{5}{8}$

b) What part of 18 is 8 ? $\frac{8}{18}$ or $\frac{4}{9}$

c) Five is what part of 35 ? $\frac{5}{35}$ or $\frac{1}{7}$

3) Add:

a) $\begin{array}{r} 4.109 \\ \underline{.894} \\ 5.003 \end{array}$ b) $\begin{array}{r} 704.6 \\ \underline{3.9} \\ 708.5 \end{array}$ c) $\begin{array}{r} 476.92 \\ \underline{23.09} \\ 500.01 \end{array}$ d) $\begin{array}{r} 6.729 \\ \underline{.284} \\ 7.013 \end{array}$

4) Multiply or divide:

a) $\begin{array}{r} 6.24 \\ \underline{\times\ 2.3} \\ 14.352 \end{array}$ b) $\begin{array}{r} 30.08 \\ \underline{\times\ .35} \\ 10.5280 \end{array}$ c) $\begin{array}{r} 4.81 \\ \underline{\times\ 3.46} \\ 16.6426 \end{array}$ d) $\begin{array}{r} 8.093 \\ \underline{\times\ .249} \\ 2.015157 \end{array}$

e) $\overset{92.5}{.7\overline{)64.75}}$ f) $.08\overline{)3.696}$ 46.2 g) $2.6\overline{)8.450}$ 3.25

5) Place in order from largest to smallest:

a) $\frac{1}{3}, \frac{7}{9}, \frac{8}{8}, \frac{2}{3}, \frac{5}{18}$

b) $\frac{2}{3}, \frac{3}{4}, \frac{5}{5}, \frac{7}{12}, \frac{5}{8}$

c) $\frac{1}{12}, \frac{3}{12}, \frac{5}{12}, \frac{1}{6}, \frac{1}{2}$

d) $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{1}{8}, \frac{1}{10}$

e) 7.2, 6.8, .74, .999, 1.3, 2

f) .096, .87, .39, .562, 34

g) 3, .9, 1, .82, .0094, 7.2

a) 1, $\frac{7}{9}$, $\frac{2}{3}$, $\frac{1}{3}$, $\frac{5}{8}$

b) $\frac{5}{5}$, $\frac{3}{4}$ $\frac{2}{3}$ $\frac{5}{8}$, $\frac{7}{12}$

c) $\frac{1}{2}$, $\frac{5}{12}$, $\frac{3}{12}$, $\frac{1}{6}$, $\frac{1}{12}$

d) $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$ $\frac{1}{8}$, $\frac{1}{10}$

e) 7.2, 6.8, 2, 1.3, .999, .74

f) 34, .87, .562, .39, .096

g) 7.2, 3, 1, .9, .82, .0094

SPECIAL WORDS IN THIS UNIT

Some of the following words are difficult, that is, it is hard to remember the meaning and it is not easy to spell them correctly. But they are found frequently in use around a hospital. Hospital workers may need to know them.

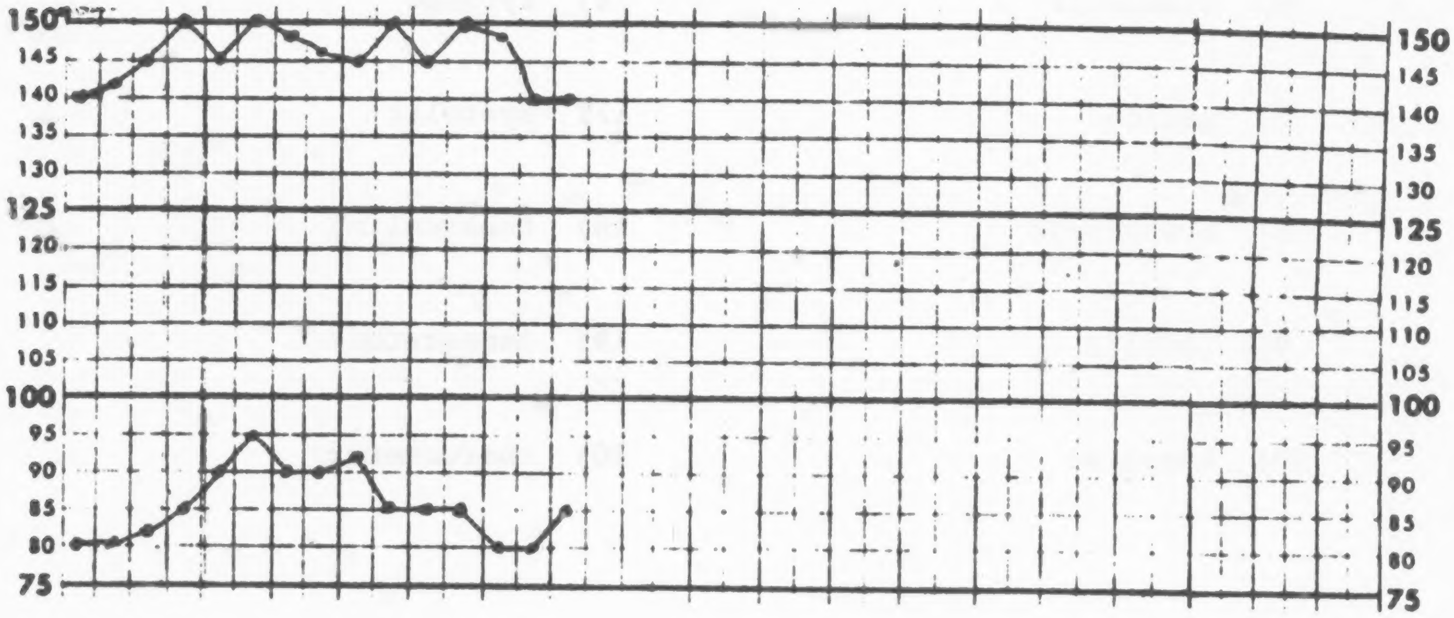
1) antiseptic
2) alcohol
3) acetic acid
4) beaker
5) cubic centimeter (cc.)
6) diastolic
7) gallon
8) hypodermic
9) insulin
10) hospital
11) liter
12) minum
13) lysol
14) ounce
15) pressure
16) syringe
17) systolic
18) tuberculin
19) temperature
20) thermometer

BLOOD PRESSURE

When the doctor refers to "blood pressure" he is thinking of two different pressures. One, the Systolic, is the pressure of the blood coming out of the heart, the other is the Diastolic, or pressure of the blood returning to the heart. Normal pressures for the Systolic are 140 to 160. Normal pressures for the Diastolic are 80 to 100. Both pressures are taken with the "wrap around the arm" instrument, and recorded in this manner:

140/80	142/80	145/82	150/85	145/90
150/95	148/90	146/90	145/92	150/85
145/85	150/85	148/80	140/80	140/85

Using the above information, make a graph on the following chart. Each of the columns represents a reading made every four hours. (Example below is only a portion of the entire Blood Pressure Chart)



FORM NO. 115A

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THE DELAWARE HOSPITAL

BLOOD PRESSURE CHART

IF NOT STAMPED WITH PLATE FILL IN ALL BEL

ROOM NO.
NAME Ditto Available
MED. REC. NO.
MD

DATE
OUR

250
245
240
235
230
225
220
215
210
205
200
195
190
185
180
175
170
165
160
155
150
145
140
135
130
125
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0

379

A. Graph the blood pressures of the following patients:

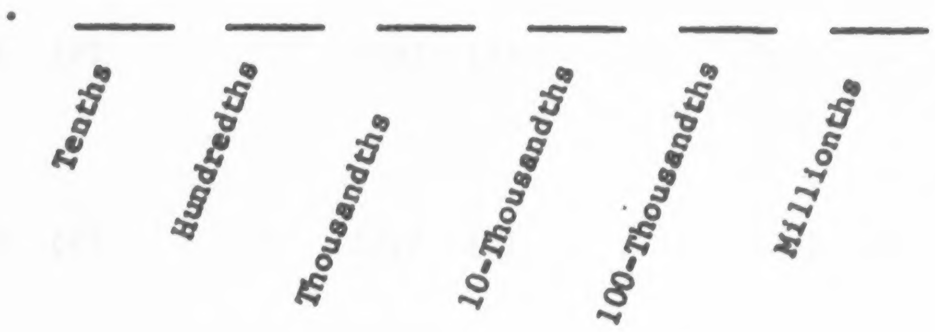
1) Mr. John Green	2) Miss Joan Blue	3) Mr. William Jones
180/112	132/67	225/85
175/110	130/67	223/90
182/112	135/70	220/85
180/112	132/68	210/84
185/114	130/68	208/82
182/112	135/71	208/82
178/110	138/72	200/80
180/112	133/70	210/83
183/112	132/68	215/84
178/110	138/72	200/85
174/108	140/73	190/83
170/105	132/70	200/85
172/107	138/73	195/85
168/103	140/76	190/85
165/101	143/80	200/90
163/99	150/80	200/90
160/95	151/82	180/85
158/92	151/82	170/85
158/92	148/82	165/85
156/93	151/85	165/85

READING OF DECIMALS

We have already learned to read whole numbers. Whole numbers are on the left of the decimal point and have a value of 0 or greater.

Decimal numbers are always to the right of the decimal point and have a value less than one.

Each decimal place has a value (or name) as below:



To read a decimal, you read it as a whole number and give it the name of the place fartherest to the right.

Example:

0.04 - four hundredths

0.167 - one hundred sixty seven thousandths

0.4005 - four thousand five ten thousandths

To read a decimal number larger than 1, you read the whole number, read the decimal point as "and", then read the decimal number.

Example:

3.06 - three and six hundredths

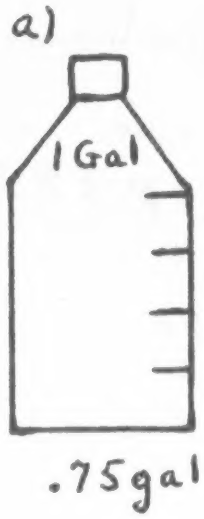
6007.0150 - six thousand seven and one hundred fifty ten thousandths

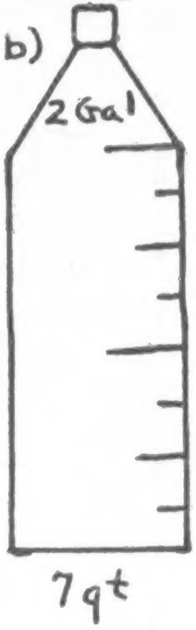
A. **Write in English words:**

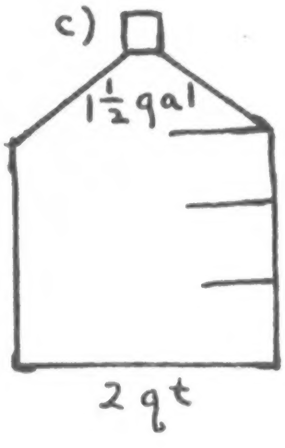
1) 10.63
2) 1.92
3) .04
4) 6.13
5) 3.07
6) 6.2
7) .007
8) .08
9) .14
10) 1.76
11) 1.16
12) 12.9
13) 104.802
14) 16.4
15) 4.12
16) 9.81
17) 6.3
18) 1.21
19) 2.61
20) 7.82
21) 303.75
22) 5006.070
23) 5.0007
24) 36.7
25) 909.064
26) 3.3
27) 5.03
28) 7.30
29) 94
30) 6.009

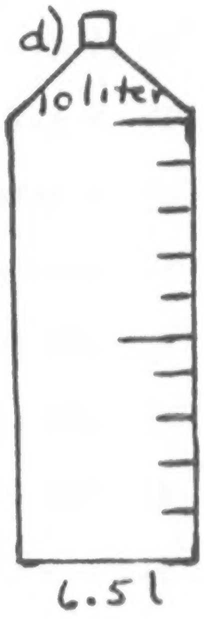
BOTTLES AND BEAKERS

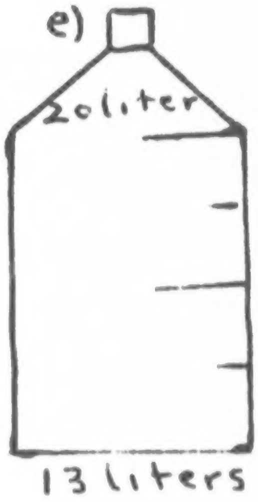
Bottles have been used many years for storing medicines. Beakers are open vessels which usually have a kind of spout for pouring. They are used for measuring. Lines marked on the sides of bottles and beakers indicate the volume of liquid they contain. Fill up to the mark the volume indicated by shading the drawing with a pencil.

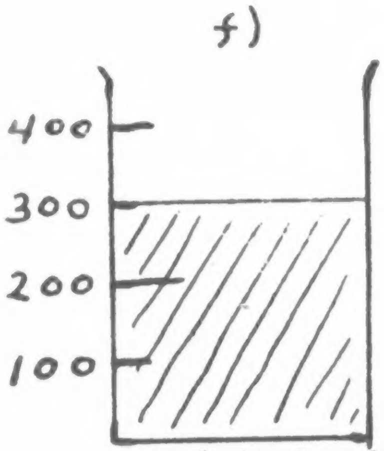

a)
1 Gal
.75gal

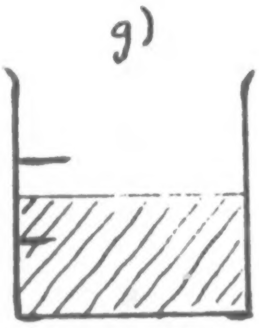


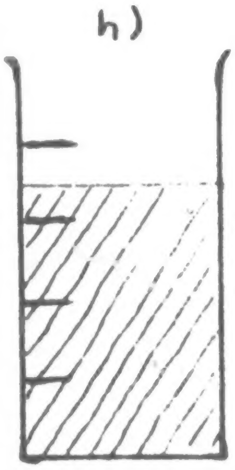


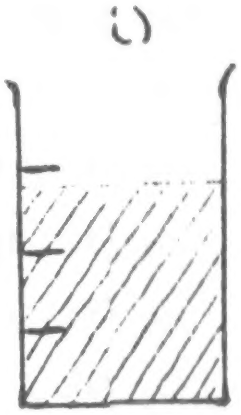

d)
10 liter
6.5 l

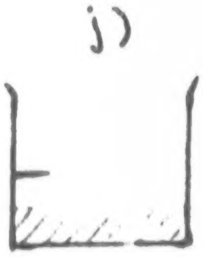

e)
20 liter
13 liters


f)
400
300
200
100









Each beaker has lines which mark 100 cc of liquid. Determine the amount in each as closely as you can.

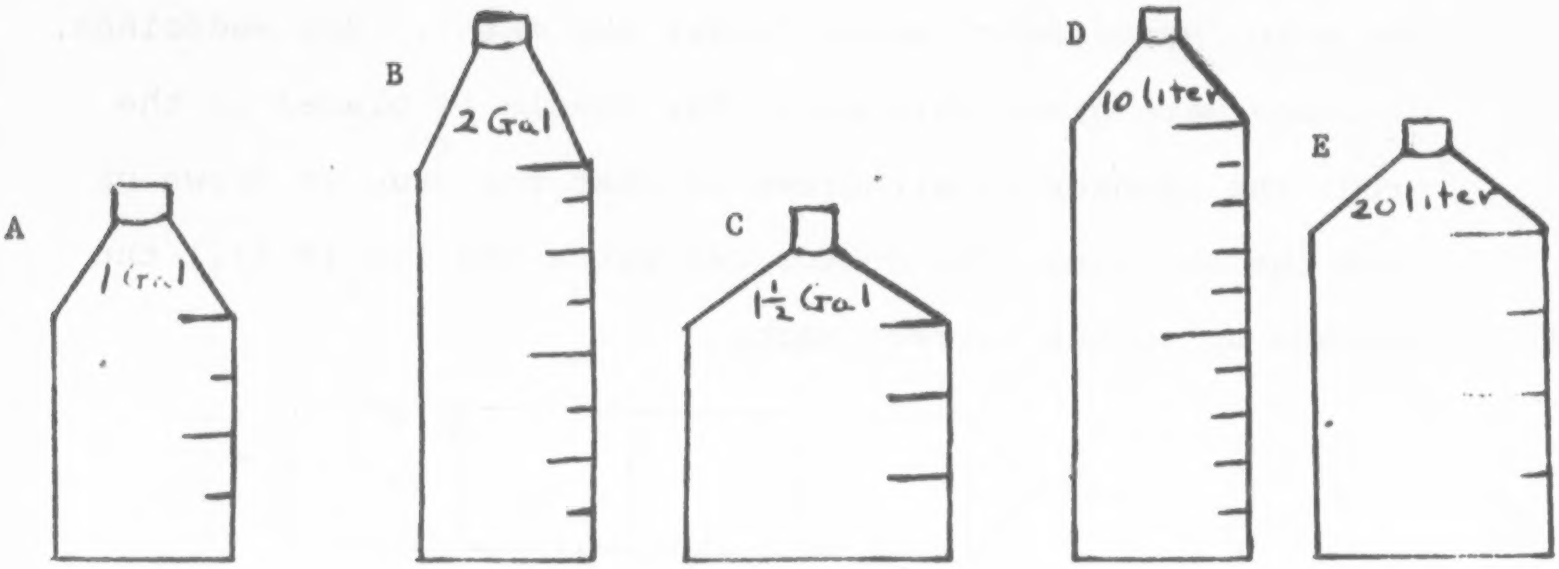
Shade in the following amounts in the containers named:

Amount	**Container**
1) .25 gal.	a
2) 5 qt.	b
3) 6 qt.	c
4) 9 liters	d
5) 5000 gm	e
6) 250 cc	f
7) 100 cc	g
8) 350 cc	h
9) 175 cc	i
10) 25 cc	j
11) 1/2 gal.	a
12) 3 qt.	b
13) 4 qt.	c
14) 3.5 liters	d
15) 7.5 liters	e
16) 150 cc	f
17) 80 cc	g
18) 325 cc	h
19) 280 cc	i
20) 20 cc	j

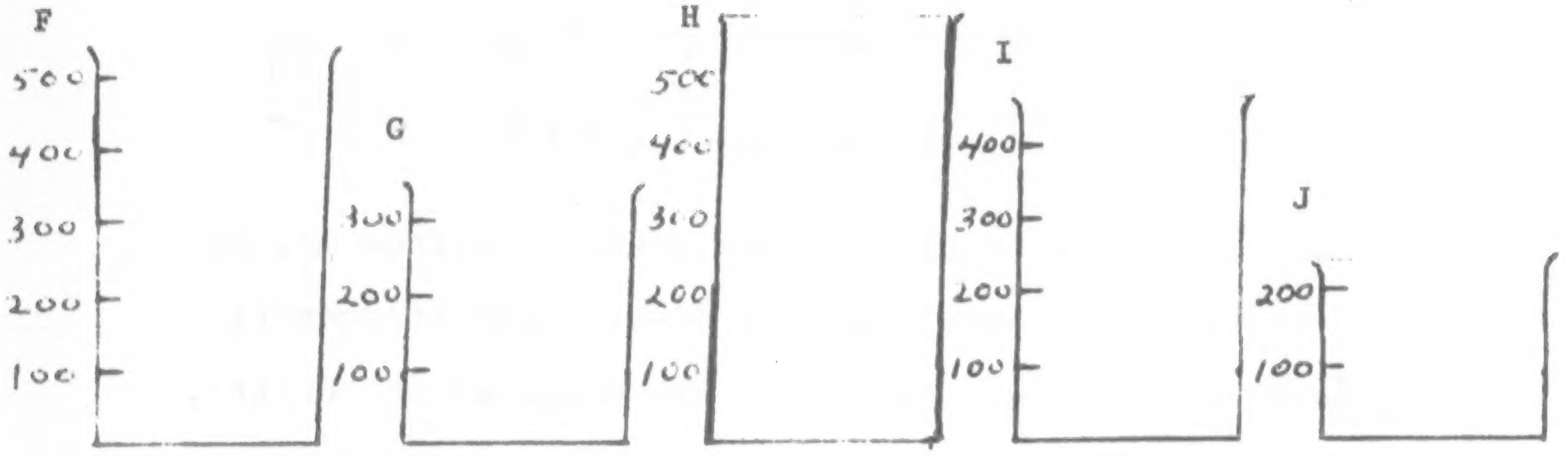
These problems will fill one ditto, for P. 385

Ditto
Available

BOTTLES


A
1 Gal
B
2 Gal
C
1½ Gal
D
10 liter
E
20 liter

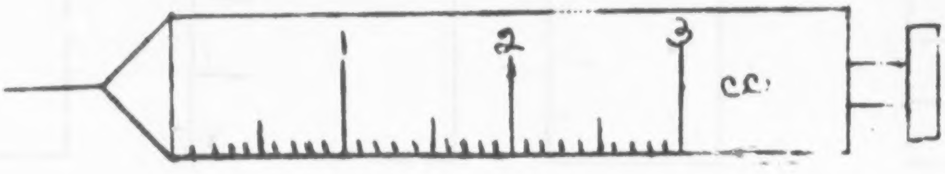
BEAKERS


F
500
400
300
200
100
G
300
200
100
H
500
400
300
200
100
I
400
300
200
100
J
200
100

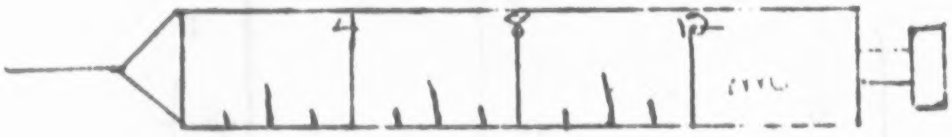
Units equal cubic centimeters

NEEDLES

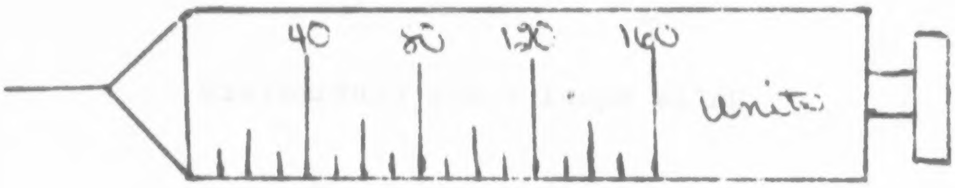
Most people refer to a hypodermic syringe as a "needle". The word "Hypodermic" means "under the skin". May medicines, or drugs, are given this way. The needle is placed in the drug, the plunger is withdrawn so that the drug is drawn up into the syringe. The doctor can watch the liquid fill the syringe up to the correct mark.



Some diseases, such as Tuberculosis, are treated with small amounts of the drug. Thus a syringe may be marked off so as to measure "drops". In this illustration "M" stands for "Minum".

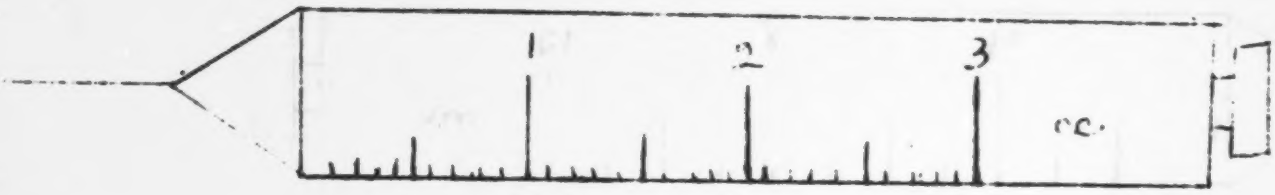


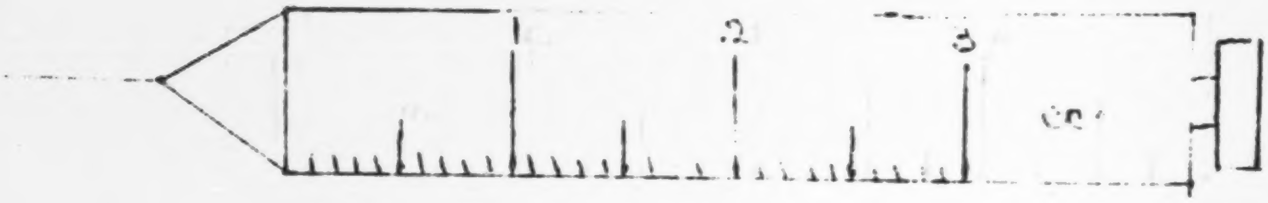
In the treatment of Diabetes an insulin syringe may be used. Insulin is a very powerful drug. With it doctors have saved many lives. The doses are measured in "units".

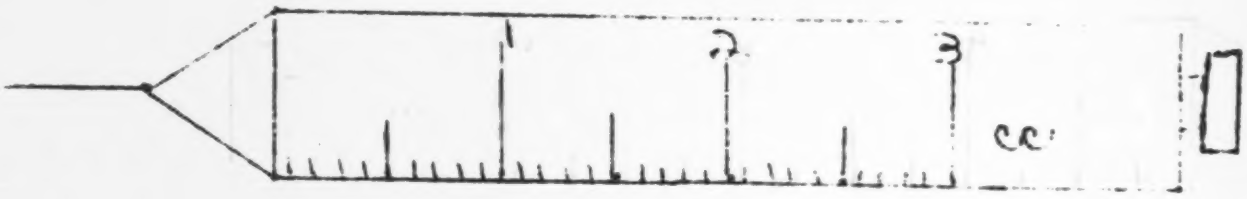


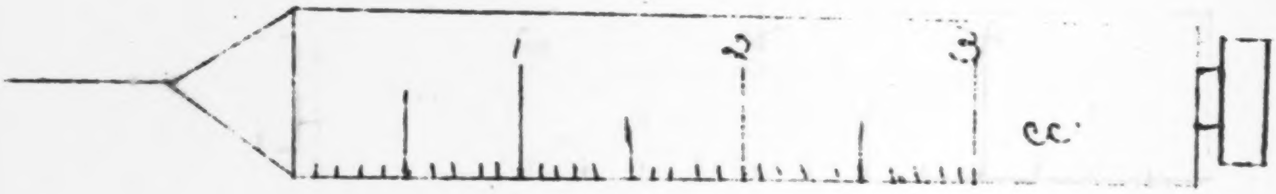
HYPODERMIC SYRINGS

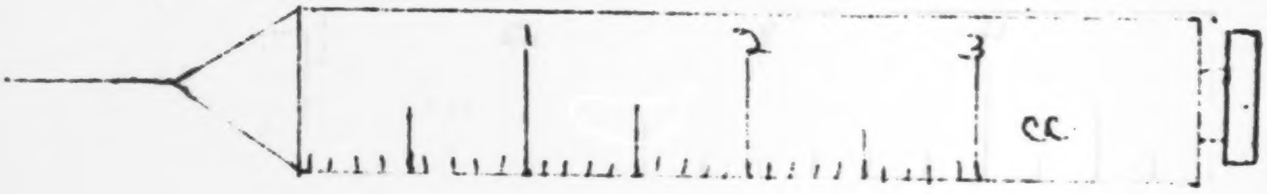
Ditto
Available

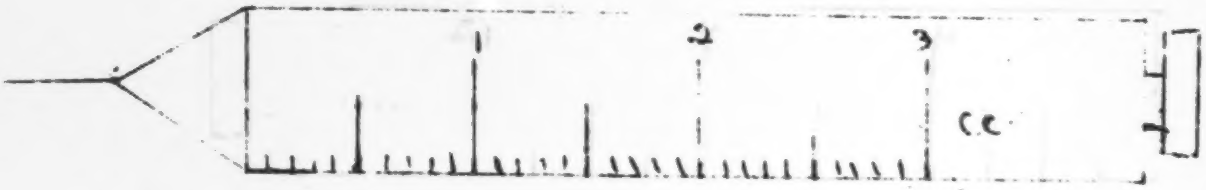












Shade in the following volumes of liquid:

1) 1.3 cc
2) 2.5 cc
3) .7 cc
4) 2.9 cc
5) 1.6 cc
6) .8 cc

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7

TUBERCULIN SYRINGES

Ditto
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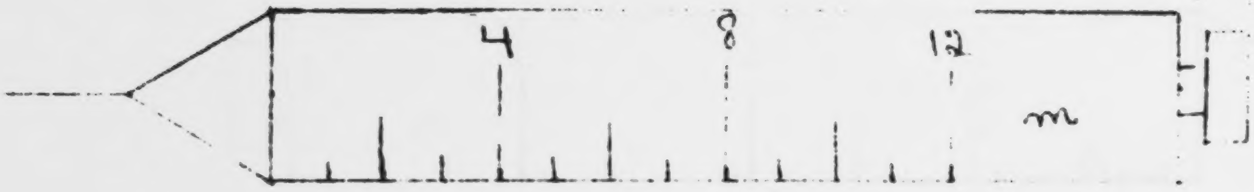
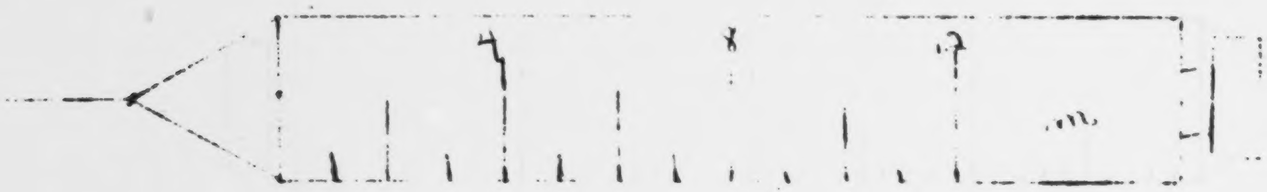
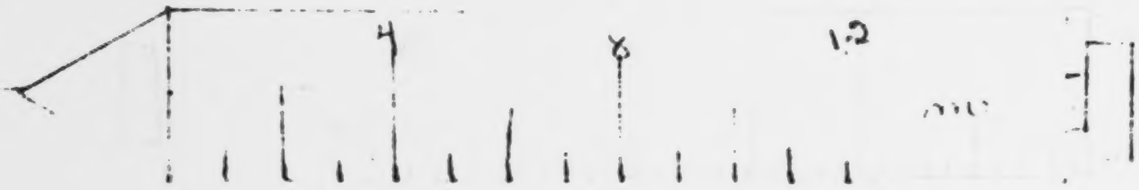
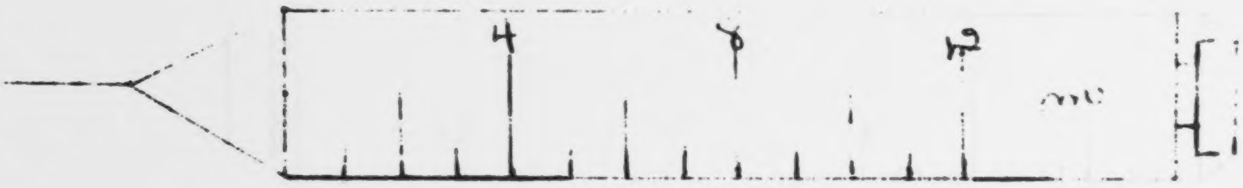
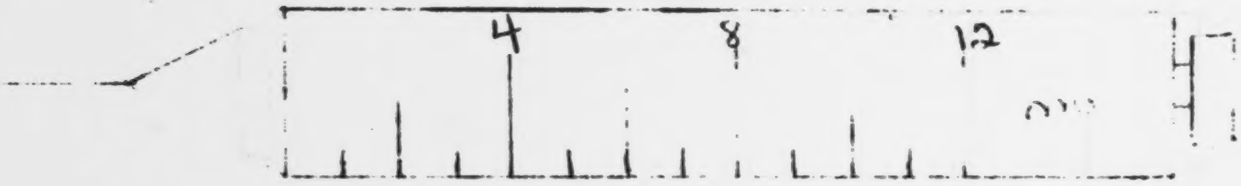
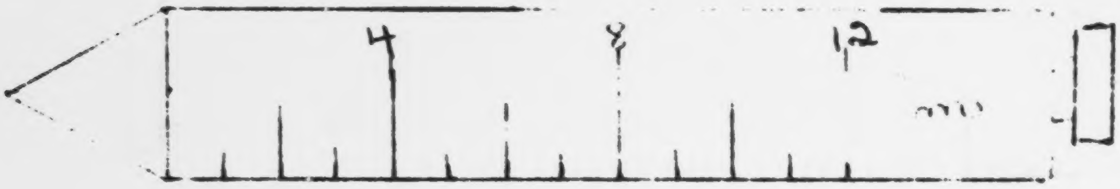










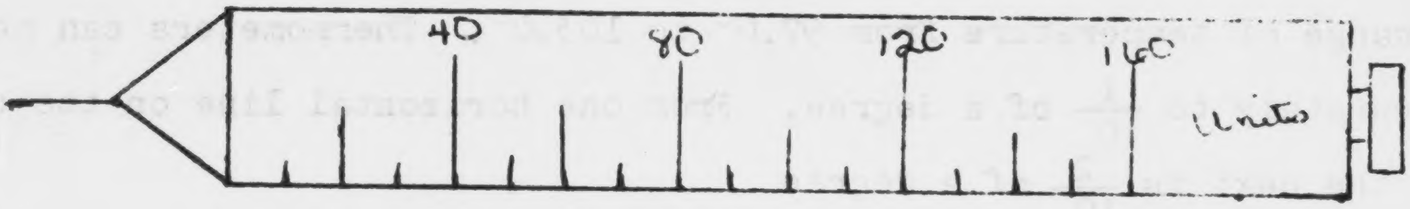


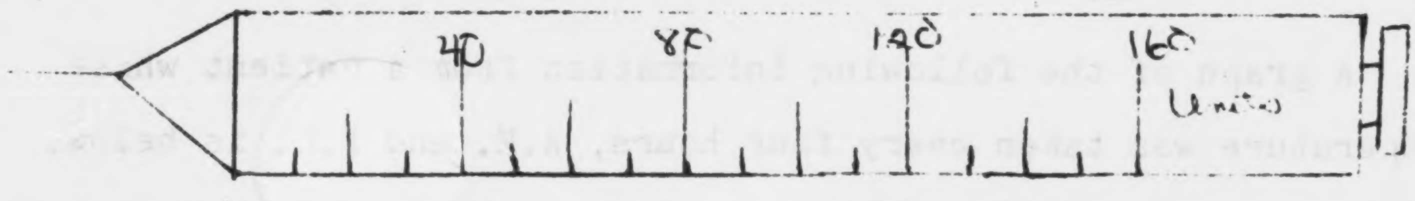
Shade in the following volumes of liquid:

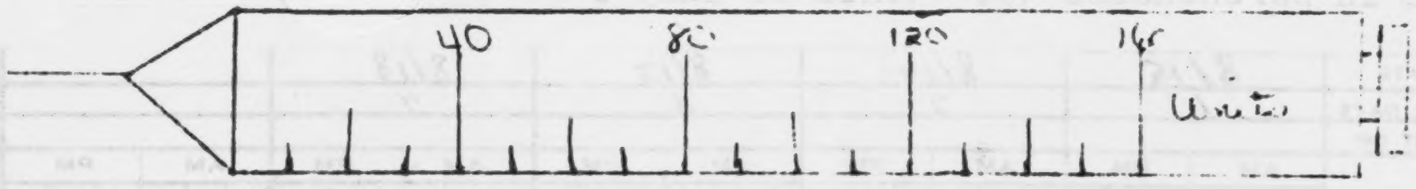
1) 4 m
2) 10 m
3) 3 m
4) 6 m
5) 11 m
6) 9 m

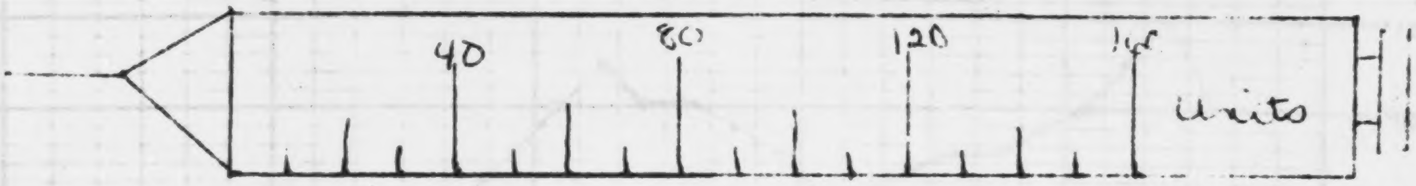
INSULIN SYRINGE

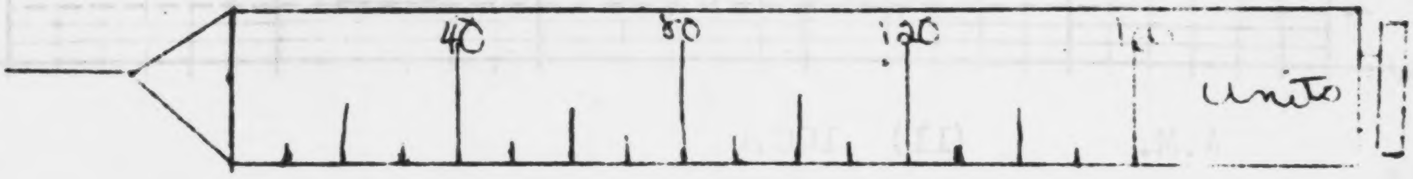
Ditto
Available

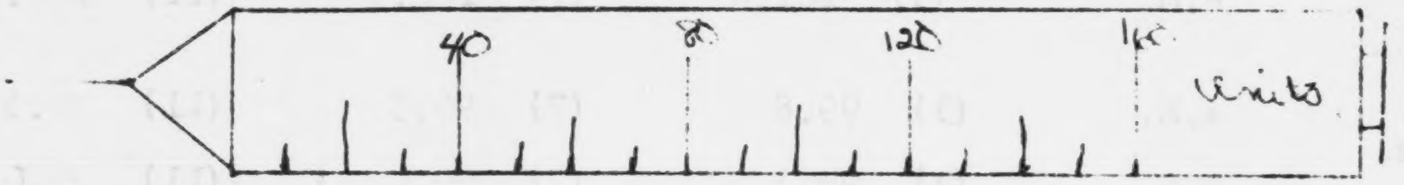

40
80
120
160
Units


40
80
120
160
Units


40
80
120
160
Units


40
80
120
160
Units


40
80
120
160
Units


40
80
120
160
Units

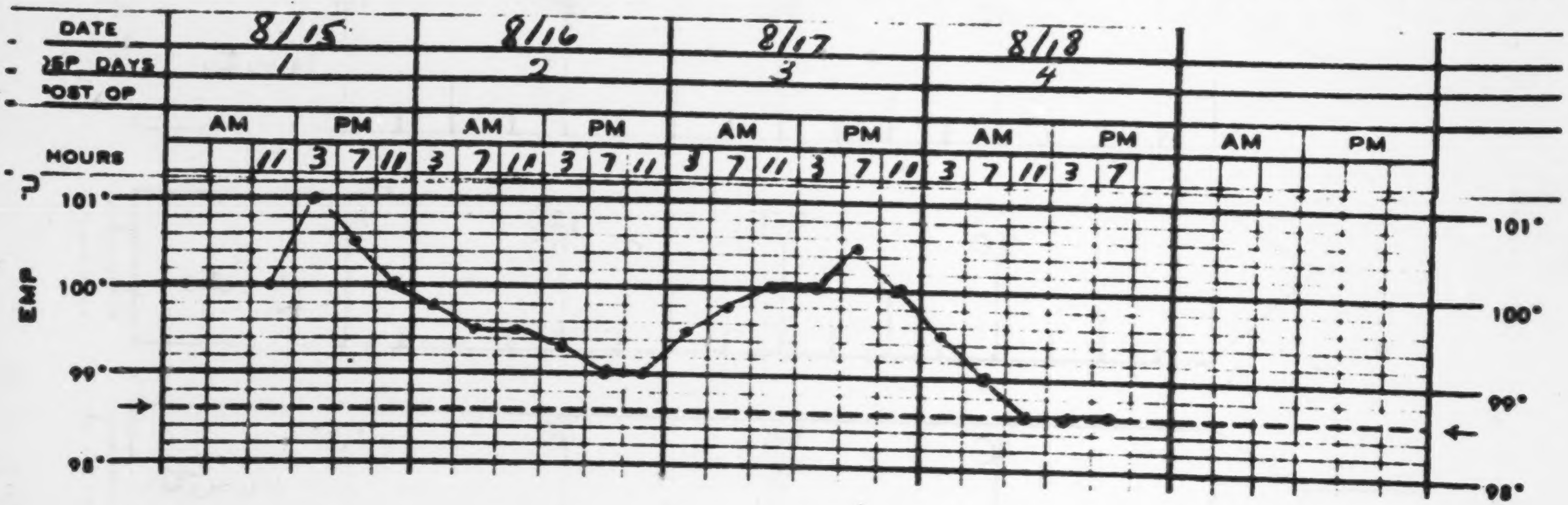
Shade in the following volumes of liquid:

1) 120 units
2) 60 units
3) 130 units
4) 10 units
5) 85 units
6) 90 units

Body Temperature

The normal body temperature is 98.6°. The following chart shows a range of temperature from 97.0° to 105.0°. Thermometers can measure accurately to $\frac{1}{10}$ of a degree. From one horizontal line on the chart to the next is $\frac{2}{10}$ of a degree.

A graph of the following information from a patient whose temperature was taken every four hours, A.M. and P.M. is below. Times are in parentheses (). (This is only a portion of Temperature Chart.)



8/15	A.M.	(11)	100.0				
	P.M.	(3)	101.0	(7)	100.5	(11)	100.0
8/16	A.M.	(3)	99.8	(7)	99.5	(11)	99.5
	P.M.	(3)	99.3	(7)	99.0	(11)	99.0
8/17	A.M.	(3)	99.5	(7)	99.8	(11)	100.0
	P.M.	(3)	100.0	(7)	100.5	(11)	100.0
8/18	A.M.	(3)	99.5	(7)	99.0	(11)	98.6
	P.M.	(3)	98.6	(7)	98.6		

FORM NO. 116A

THE DELAWARE HOSPITAL

GRAPHIC CHART

ROOM NO.
NAME
MED. REC. NO.
MD

Ditto
Available

DATE
HOSP DAYS
POST OP
AM PM AM PM AM PM AM PM AM PM AM PM
HOURS

EMP TURE
104°
103°
102°
101°
100°
99°
98°

ESPI ON & SE
130
120
110
100
90
80
70
60
50
40
30
20
10

B.P S D
SP DRUG

AKE
ORAL
INFUSION
TUBE
TOTAL

UTP (SPECIFY ROUTE)
TOTAL

STOOLS
WEIGHT

391

Make a graph of body temperatures. Hour is in parenthesis.

1) Mr. Jones

9/12	A.M.	(6)	100.5	(10)	99.9		
	P.M.	(2)	100.0	(6)	100.0	(10)	101.0
9/13	A.M.	(2)	100.0	(6)	99.8	(10)	99.9
	P.M.	(2)	99.5	(6)	98.6	(10)	99.4
9/14	A.M.	(2)	100.0	(6)	99.5	(10)	99.3
	P.M.	(2)	99.2	(6)	98.8	(10)	98.8
9/15	A.M.	(2)	98.6	(6)	98.6		

2) Mrs. Mary Smith

10/15	A.M.	(1)		(5)		(9)	
	P.M.	(1)		(5)	104.0	(9)	103.8
10/16	A.M.	(1)	104.1	(5)	104.0	(9)	103.8
	P.M.	(1)	103.8	(5)	104.0	(9)	102.6
10/17	A.M.	(1)	102.8	(5)	101.9	(9)	101.5
	P.M.	(1)	102.0	(5)	100.9	(9)	99.[illegible]
10/18	A.M.	(1)	100.3	(5)	99.8	(9)	99.[illegible]
	P.M.	(1)	99.8	(5)	99.2	(9)	99.1
10/19	A.M.	(1)	99.3	(5)	99.0	(9)	99.0
	P.M.	(1)	98.8	(5)	98.9	(9)	98.6
10/20	A.M.	(1)	98.6	(5)	98.6		

LIQUID MEASURES

Ditto Available

One has to be in the hospital only a short time to hear the expressions, "a drop of", "three drops of", and so on. This is the way medicine is measured frequently. The system looks like this (a drop being called a minum).

480 Minums = 1 ounce
16 ounces = 1 pint
2 pints = 1 quart
4 quarts = 1 gallon

The abbreviations for these words are: minum = M.; ounce = oz; pint = pt.; quart = qt.; and gallon = gal. Try completing the following sentences.

1) 1 pint contains 7680 M.
2) 1 qt. contains 32 oz.
3) 2 gal. is 16 pt.
4) 32 oz. is 2 pts.
5) 2 qt. is 64 oz.
6) 4 gal. is 32 pts.
7) 1 qt. = ____ M. 15,360
8) 12 pt. = 192 oz.
9) 16 oz. = $\frac{1}{2}$ qt.
10) 5 gal. ____ M. 307,200
11) 240 M. = $\frac{1}{2}$ oz.
12) 1 pt. = $\frac{1}{8}$ gal.
13) 4 qt. = 8 pt.
14) 10 gal. = 80 pts.

TRUE or FALSE ?

Ditto Available

1) 32 ounces is 1 quart True

2) 8 quarts is 2 gallons True

3) 2 ounces is 960 minums True

4) 1 minum is 5 drops False

5) 8 gallons is 18 pints False

6) 10 pints is 5 quarts True

7) $1\frac{1}{2}$ quarts is 3 pints True

8) 8 ounces is $\frac{1}{2}$ pint True

9) 1 ounce is 500 minums False

10) 7680 drops is 1 pint True

11) 2 pints is $\frac{1}{2}$ gallon False

12) 16 ounces is 1 pint True

Change to Decimal Fractions:

1) $\frac{1}{4}$ .25

2) $\frac{1}{25}$ .04

3) $\frac{3}{4}$ .75

4) $\frac{1}{5}$ .20

5) $\frac{1}{3}$ $.33\frac{1}{3}$

6) $\frac{1}{2}$ .50

7) $\frac{15}{100}$ .15

8) $\frac{1}{8}$ .125

9) $\frac{2}{3}$ $.66\frac{2}{3}$

10) $\frac{3}{25}$ .12

11) $\frac{3}{100}$ .03

12) $\frac{14}{25}$ .56

13) $\frac{16}{100}$ .16

14) $\frac{99}{100}$ .99

15) $\frac{5}{10}$ .5

16) $\frac{16}{25}$ .64

17) $\frac{9}{10}$ .9

18) $\frac{18}{100}$ .18

19) $\frac{2}{4}$ .5

20) $\frac{3}{6}$ .50

Reduce the following fractions:

1) $\frac{4}{16}$ $\frac{1}{4}$

2) $\frac{50}{100}$ $\frac{1}{2}$

3) $\frac{42}{420}$ $\frac{1}{10}$

4) $\frac{16}{64}$ $\frac{1}{4}$

5) $\frac{90}{360}$ $\frac{1}{4}$

6) $\frac{15}{45}$ $\frac{1}{3}$

7) $\frac{14}{98}$ $\frac{1}{7}$

8) $\frac{6}{36}$ $\frac{1}{6}$

9) $\frac{15}{120}$ $\frac{1}{8}$

10) $\frac{15}{60}$ $\frac{1}{4}$

11) $\frac{70}{630}$ $\frac{1}{9}$

12) $\frac{52}{104}$ $\frac{1}{2}$

13) $\frac{19}{57}$ $\frac{1}{3}$

14) $\frac{40}{120}$ $\frac{1}{3}$

15) $\frac{60}{180}$ $\frac{1}{3}$

16) $\frac{15}{75}$ $\frac{1}{5}$

17) $\frac{41}{205}$ $\frac{1}{5}$

18) $\frac{25}{150}$ $\frac{1}{6}$

19) $\frac{142}{710}$ $\frac{1}{5}$

20) $\frac{14}{70}$ $\frac{1}{5}$

Changing Units to Other Units

A 1) 4 qts. = 128 oz.

2) 2 pts. = 32 oz.

3) 2 qts. = 4 pts.

4) 2 gals. = 256 oz.

5) 4 qts = 61,440 m

6) 6 qts. = 192 oz.

7) 4 pts. = 3,070 m

8) 1 gal. = 61440 m

9) 3 qts. = 6 pts.

10) $3\frac{1}{2}$ qt. = 7 pts.

Ratios are just Fractions

Example: 20 oz. is what part of 2 qts.

$$\frac{20\text{ oz.}}{2\text{ qt.}} = \frac{20\text{ oz.}}{64\text{ oz.}}, \text{ or } \frac{5}{16}$$

B 11) 15 oz. is what part of 3 qts? $\frac{5}{32}$

12) 4 pts. is what part of 1 gal? $\frac{1}{2}$

13) 52 oz. is what part of 6 pts? $\frac{13}{24}$

14) 160 m is what part of 2 qts? $\frac{1}{318}$

15) 16 oz. is what part of 8 qts? $\frac{1}{16}$

16) 272 m is what par of 1 gal ? $\frac{17}{10360}$

17) 37 oz. is what part of 2 gal? $\frac{37}{128}$

18) 16 pts. is what part of 4 gal. $\frac{1}{2}$

19) 40 oz. is what part of 2 qt. $\frac{5}{8}$

20) 2 qt. is what part of 42 oz. $\frac{32}{21}$

A 1) 8 qts. = 256 oz.

2) 3 pts. = 48 oz.

3) 4 qts. = 8 pt.

4) 1 gal. = 128 oz.

5) 3 qts. = 46080 m

6) 5 qts. = 160 oz.

7) 3 pts. = 23040 m

8) 2 gal = 122880 m

9) $2\frac{1}{2}$ qt. = 5 pts.

10) $4\frac{1}{2}$ qt. = 9 pt.

To find the ratios, similar units must be compared

Example: 240 minums is what part of a $\frac{1}{2}$ pt.

$$\frac{240 \text{ minums}}{\frac{1}{2} \text{ pint}} = \frac{240 \text{ minums}}{3840 \text{ minums}} = \frac{3}{48}, \text{ or } \frac{1}{16}$$

B 11) 16 oz. is what part of 2 quarts? $\frac{16 oz}{2 qt} = \frac{16 oz}{64 oz} = \frac{1}{4}$

12) 3 pts. is what part of 1 gallon ? $\frac{3 pt}{1 gal} = \frac{3 pt}{8 pt} = \frac{3}{8}$

13) 16 oz. is what part of 2 pts. $\frac{16 oz}{2 pt} = \frac{16 oz}{32 oz} = \frac{1}{2}$

14) 170 m is what part of 4 quarts ? $\frac{170 m}{4 qt} = \frac{170 m}{61440 m} = \frac{17}{6144}$

15) 16 oz. is what part of 7 qts. $\frac{16 oz}{7 qt} = \frac{16 oz}{224 oz} = \frac{1}{14}$

16) 299 m is what part of 1 gallon ? $\frac{299}{1 gal} = \frac{299 m}{245760 m} = \frac{299}{245760}$

17) 32 oz is what part of 4 gallon ? $\frac{32 oz}{4 gal} = \frac{32 oz}{512 oz} = \frac{4}{63}$

18) 12 pts. is what part of 3 gallon ? $\frac{12 pt}{3 gal} = \frac{12 pt}{24 pt} = \frac{1}{2}$

19) 42 oz. is what part of 3 qt. $\frac{42 oz}{3 qt} = \frac{42 oz}{96 oz} = \frac{7}{16}$

20) 3 qt. is what part of 38 oz. $\frac{3 qt}{38 oz} = \frac{96 oz}{38 oz} = \frac{48}{19}$ or $2\frac{10}{19}$

METRIC SYSTEM

In the metric system units are divided into tenths which makes the system easy to use. Here are some metric and English units compared.

1	drop of water	$= \frac{1}{15}$ cc	$= \frac{1}{15}$ gm.
1	cup	= 250 cc	= 250 gm.
1	pint	= 500 cc	= 500 gm.
1	quart	= 1 liter	= 1000 gm.

In the above "cc" stands for cubic centimeter. A "cc" can be pictured as a small cube of wood which measures about $\frac{1}{2}$ inch along each edge. The weight of 1 cc of water is 1 gram. We abbreviate gram as "gm". A liter, abbreviated "L", is approximately one quart. Try these problems.

1) 1 gm is the weight of _____ drops of water

2) 1 cup contains ______ drops of water

3) 1 liter is ______ cups

4) 1 quart is ______ gm

5) 2000 gm is ______ pt

6) ______ cc = 5 cups

7) _______ cc = 1 liter

8) ______ cc = 1 pint

9) 10,000 gm of water is ______ liters

10) 15 crops of water is ______ gm

Changing Metric System

A 1) 3 cups = _____ gm 750

2) 2 l= _____ cup 4

3) 3 pt = _____ cup 6

4) 2 l = _____ pt. 4

5) 4 qt. = _____ cup 16

6) 6 qt. = _____ pt. 12

7) 5 pt. = _____ cup 10

8) 5 qt = _____ cup 20

9) $6\frac{1}{2}$ qt. = _____ pt. 13

10) $4\frac{1}{2}$ qt. = _____ cup 18

To make ratio you must compare like units

Example: 3 cups is what part of 2 quarts ?

$$\frac{3\text{ cups}}{2\text{ qts.}} = \frac{3\text{ cups}}{8\text{ cups}} = \frac{3}{8}$$

11) 4 pts. is what part of 4 qts? $\frac{4\text{pts}}{4\text{qts}} = \frac{4\text{pts}}{8\text{pts}} = \frac{1}{2}$

12) 8 cups is what part of 2 qts. $\frac{8\text{cups}}{2\text{qts}} = \frac{8\text{ cups}}{8\text{ cups}} = \frac{1}{1} = 1$

13) 10 cups is what part of 3 pints? $\frac{10\text{cups}}{3\text{pts}} = \frac{10\text{ cups}}{6\text{ cups}} = 5/3$

14) 4 cups is what part of 4 qt. $\frac{4\text{ cups}}{4\text{ qts}} = \frac{4\text{ cups}}{16\text{ cups}} = \frac{1}{4}$

15) 8 pts. is what part of 21 qts. $\frac{8\text{ pts}}{21\text{ qts}} = \frac{8\text{ pts}}{42\text{ pts}} = \frac{4}{21}$

16) 6 cups is what part of 3 pts. $\frac{6\text{ cups}}{3\text{ pts}} = \frac{6\text{ cups}}{6\text{ cups}} = \frac{1}{1} = 1$

17) 3 cups is what part of 4 qts. $\frac{3\text{cups}}{4\text{qts}} = \frac{3\text{ cups}}{16\text{ cups}} = 3/16$

18) 12 pts. is what part of 8 qts. $\frac{12\text{ pts}}{8\text{ qts}} = \frac{12\text{ pts}}{16\text{ pts}} = 3/4$

19) 12 qts. is what part of 3 cups $\frac{12\text{ qts}}{3\text{cups}} = \frac{48\text{ cups}}{3\text{ cups}} = \frac{16}{1}$

20) 16 pts. is what part of 3 cups. $\frac{16\text{ pts}}{3\text{ cups}} = \frac{32\text{ cups}}{3\text{ cups}} = 32/3$

400

A 1) 1 qt. = ______ pt. (2)

2) 2 pt. = ______ cups (4)

3) 3 qt. = ______ pt. (6)

4) 8 qt. = ______ pt. (16)

5) 3 pt. = ______ gr (1500)

6) 3 qt. = ______ cups (12)

7) 2 pt. = ______ gr. (1000)

8) 2 pt. = ______ L (4)

9) $2\frac{1}{2}$ pt. = ______ cups (5)

10) $3\frac{1}{2}$ qt. = ______ pt. (7)

To make ratio you must compare like units

Example: 50 drops of water is part of a $\frac{1}{2}$ pt.

$$\frac{50\text{ drops}}{\frac{1}{2}\text{ pint}} = \frac{50\text{ drops}}{3750\text{ drops}} = \frac{1}{75}$$

B 11) 1 pt. is what part of 2 quarts ? $\frac{1\text{ pt.}}{2\text{ qts}} = \frac{1\text{ pt.}}{4\text{ pt}} = \frac{1}{4}$

12) 8 cups is what part of 4 quarts ? $\frac{8\text{ cups}}{4\text{ qts}} = \frac{8\text{ cups}}{16\text{ cups}} = \frac{1}{2}$

13) 8 cups is what part of 12 pts? $\frac{8\text{ cups}}{12\text{ pts}} = \frac{8\text{ cups}}{24\text{ cups}} = \frac{1}{3}$

14) 3 cups is what part of 8 quarts? $\frac{3\text{ cups}}{8\text{ qts}} = \frac{3\text{ cups}}{32\text{ cups}} = 3/32$

15) 5 pts. is what part of 20 quarts ? $\frac{5\text{ pt}}{20\text{ qt}} = \frac{5\text{ pts}}{40\text{ pts}} = \frac{1}{8}$

16) 5 cups is what part of 4 pts? $\frac{5\text{ cups}}{4\text{ pts}} = \frac{5\text{ cups}}{8\text{ cups}} = 5/8$

17) 4 cups is what part of 5 qts? $\frac{4\text{ cups}}{5\text{ qts}} = \frac{4\text{ cups}}{20\text{ cups}} = \frac{1}{5}$

18) 11 pts. is what part of 10 qts? $\frac{11\text{ pts}}{10\text{ qts}} = \frac{11\text{ pts}}{20\text{ pts}} = \frac{11}{20}$

19) 21 qts. is what part of 4 cups? $\frac{21\text{ qts}}{4\text{ cups}} = \frac{84\text{ cups}}{4\text{ cups}} = \frac{21}{1} = 21$

20) 19 pts. is what part of 2 cups? $\frac{19\text{ pts}}{2\text{ cups}} = \frac{38\text{ cups}}{2\text{ cups}} = \frac{19}{1} = 19$

ANTISEPTIC SOLUTIONS

One job, sometimes given orderlies to do, is the making of solutions used in the hospital. The solutions are of various types. "Type A," for example, is 500 cc. of alcohol in 3000 cc. of water. It is necessary to learn the ratio of "parts of alcohol to parts of water."

$$\frac{\text{Parts of alcohol}}{\text{Parts of water}} = \frac{500}{3000} = \frac{1}{6}$$

Thus for every one part of alcohol there must be six parts of water. Suppose he finds a bottle that contains 250 cc. of alcohol, how much water does he need to add to make a correct solution? He solves the problem like this:

$$\frac{1}{6} = \frac{250\text{ cc.}}{(W)} = \frac{250\text{ cc.}}{1500\text{ cc.}}$$

Suppose he is told to prepare at least 12 quarts. How can he make it?

$$\frac{1}{6} = \frac{(A)}{12\text{ quarts}} = \frac{2\text{ quarts of alcohol}}{12\text{ quarts of water}}$$

You see he adds 2 quarts of alcohol to 12 quarts of water to get the correct fraction, or ratio. This also makes the total volume of solution 2 + 12, or 14 quarts.

MAKING SOLUTIONS

"Type A" solutions are those in which the ratio of alcohol to water is 500 cc. of alcohol to 3000 cc. of water.

1) How much water should one add to 1000 cc. of alcohol? 6000 cc

2) How much water should one add to 1 pint of alcohol? 6pt

3) How much alcohol should one add to 18 liters of water? 3 liters

4) How much alcohol should one add to 1/2 liter of water? $\frac{1}{12}$ liter

5) 50 cc. of alcohol is available. What is the resulting total volume of solution which can be produced? 350cc

"Type B" solutions are those in which the ratio of acetic acid to water is 50 cc. of acetic acid to 150 cc. of water?

1) How much water should one add to 4000 cc. of acetic acid? 120,000

2) How many liters of water should one add to 1-1/2 liters of acetic acid? $4\frac{1}{2}$ liters

3) How much acid can one add to 6 quarts of water? 2qts

4) How much acid has been added to 2160 cc. of water? 720

5) How can one get at least 3 pints of Type B Solution? What is the resulting total volume?

Add 1 pt of acid to 3 pts of water. Total: 4 pts.

400C

"Type C" solutions are those in which the ratio of lysol to water is 1 liter of lysol to 24 liters of water. Note that one liter is about one quart. Also, one liter equals 1000 cc.

1) 12 liters of water requires how much lysol? $\frac{1}{2}$ liter

2) 48 liters of water requires how much lysol? 2 liters

3) 1/2 liter of lysol requires how much water? 12 liters

4) 1-1/2 liters of lysol requires how much water? 36 liters

5) 2000 cc. of lysol requires how much water? 48000 cc

6) 100 cc. of lysol requires how much water? 2400 cc

7) 1 pint of lysol requires how much water? 24 pts

8) 6 gallons of water would need how much lysol? $\frac{1}{4}$ gal.

9) 12000 cc. of water would need how much lysol? 500 cc

10) In each of the above problems find the total resulting volume. $12\frac{1}{2}$ liters; 50 liters; $12\frac{1}{2}$ liters; $37\frac{1}{2}$ liters; 50000 cc; 2500 cc; 25 pts; $6\frac{1}{4}$ gal; 12500 cc

400D